BANGALORE WATER SUPPLY

AND

SEWERAGE BOARD

5th Floor, Cauvery Bhavan "D" Block,

K.G. Road, Bangalore 560009

Work of Comprehensive Operation and Maintenance of 6 MLD STP at Kadugodi for the period of Four Years.

(Through Karnataka Public Procurement Portal only)

https://wwwkppp.gov.in

Office of the Chief Engineer (Waste Water Management-East)

BANGALORE WATER SUPPLY & SEWERAGE BOARD

5th Floor, Cauvery Bhavan D-Block,

K.G. Road, Bangalore 560009

Telephone – 080-22945106

TENDER REFERENCE :	:	BWSSB/CE(WWM-E)/DCE(WWM-E&W)/TA-1/ /2024-25 Dt:
NAME OF THE WORK	:	**Work of Comprehensive Operation and Maintenance of 6 MLD STP at Kadugodi for the period of Four Years.**
LAST DATE AND TIME FOR RECEIPT OF TENDERS	:	06-03-2025 17:30hrs
TIME AND DATE OF OPENING OF TECHNICAL TENDERS	:	10-03-2025 16:00hrs
PLACE OF OPENING OF TECHINCAL TENDERS	:	Office of The Chief Engineer (Waste Water Management-East) Bangalore Water Supply & Sewerage Board 5thFloor, Cauvery Bhavan D-Block, K.G. Road, Bangalore 560009
TIME AND DATE OF OPENING OF PRICE TENDERS	:	Will be intimated to the qualified tenderers
PLACE OF OPENING OF PRICE TENDER	:	Will be intimated to the qualified tenderers

ADDRESS FOR COMMUNICATION	:	Office of The Chief Engineer (Waste Water Management East) Bangalore Water Supply & Sewerage Board 5th Floor, Cauvery Bhavan D-Block, K.G. Road, Bangalore 560009

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BANGALORE WATER SUPPLY AND SEWERAGE BOARD

Office of The Chief Engineer (Waste Water Management)

5th Floor, Cauvery Bhavan, K.G. Road, Bangalore-560009

INVITATION FOR TENDER

(ONLY THROUGH KARNATAKA PUBLIC PROCUREMENT PORTAL)

IFT No.: BWSSB/CE(WWM-E)/DCE(WWM-E&W)/TA-1/ /2024-25

Dt:

SECTION 1

INVITATION FOR TENDER

The **Chief Engineer(Waste Water Management-E)** invites tenders from eligibletenderers for the **Work of Comprehensive Operation and Maintenance of 6 MLD STP at Kadugodi for the period of Four Years.**detailed in the table below. Tenderers are requested to submit their tender, EMD and details of their capability to undertake the tender (as detailed in ITT Clause-3 & 6) in the Karnataka Karnataka Public Procurement Portal. Price tender will be opened only if the Tenderer is found to be qualified to execute the tendered works. Tenderers are advised to note the minimum qualification criteria specified in clause 3 of the Instructions to Tenderers to qualify for award of the contract.

1. Tender documents may be downloaded through Karnataka Public Procurement Portal www.kppp.gov.in website only from **06-02-2025 to 06-03-2025** Interested Tenderers may obtain further information by accessing the same website.

2. Tenders must be accompanied by Earnest Money Deposit specified for the work in the Table below. EMD will have to be in any one of the forms as specified in the Tender document and shall have to be valid for **45**days beyond the validity of the tender.

3. The last date and time for receipt of tenders in the Electronic Tender Box in website (www.kppp.gov.in) is **06-03-2025 up to 17:30 hrs**. The technical bids will be opened **on 10-03-2025 at 16:00hrs**. If the bid-opening day remains as public holiday, bids will be opened on the next working day at the original stipulated time.

4. Other details can be seen in the tender documents.

Sl. No	Name of the work	Tender processing fee	Amount put to tender Rs. (approx)	Bid security Rs. (EMD)	Period of completion	Eligibility criteria during last 5 years (2018-19, 2019-20, 2020-21, 2021-22,2022-23)	
						Financial Turnover (in all classes of Civil Engg. Construction	Performance and work Qualification

						works) for any of the two years during the last five years Rs.	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	**Work of Comprehensive Operation and Maintenance of 6 MLD STP arKadugodi for the period of Four Years.** .	As per Karnataka Public Procurement portal.	**Rs. Rs.786.25 Lakhs (excluding GST @18%)**	**Rs.11.79 Lakh**	**48 months**	**Rs. Rs.393.125 lakhs**	i) As a Prime Contractor, the tenderer should have satisfactorily completed at least one similar work of Operation and Maintenance of Sewage Treatment Plant based on Sequencing Batch Reactor with Disc/ Sand filtration of value not less than **Rs.463.885 lakh** in the last five financial years. ii) The tenderer should have executed in any Two financial year Operational & maintenance of 6 MLD capacity

							Sewage Treatment Plant (STP) in the last five financial years. iii) The tenderer should have executed operation and maintenance of STP's meeting all effluent parameters as per Hon'ble National Green Tribunal norms. iii) Each tender should further demonstrate: Assessed available tender capacity = (A*N*1.5 - B)>= **Rs. Rs. 927.77 Lakh (Amount put to tender including GST@18%)** iv) The tenderer should demonstrate Liquid assets and /or availability

							of credt facilities of not less than **Rs. 57.98 lakhs** (Credit lines/letter of credit/certificates from Nationalized / Schedule banks in India for meeting the fund requirement etc.,)

NOTE: 1.a. The amount put to tender Rs.786.25 Lakhs is Excluding GST at 18% and the bidder should quote for the amount.

b.The GST amount is of Rs.141.525 lakhs

2.The financial bid evaluation will be based on 1(a) of above Note

5. EMD shall be paid through OTC, NEFT, DEBIT CARD & CREDIT CARD through Karnataka Public Procurement Portal Only. The value of the Bid Security / EMD is as mentioned in the table above in column no 5.
6. Tenderers can access tender documents from www.kppp.gov.in website only and upload the required details; those are mentioned in different sections in the bid document in to electronic tender on the website. Scanned documents those are required to be furnished as per Section 2, 3 & 4 of the bid document shall be submitted through Karnataka Public Procurement Portal.
7. The Tender processing fee once paid will not be refunded.
8. The successful Tenderer would be required to furnish the performance Bank Guaranteefrom a Nationalized / Scheduled Indian Bank, with jurisdiction at Bangalore as specified, towards guarantee for completion of work within the stipulated period as mentioned in tender document.
9. Applications / requisitions from joint venture Firms are not acceptable.

10. Bangalore Water Supply and Sewerage Board (BWSSB) reserves the right to cancel or annul the entire or part of this process of invitation at any time without assigning any reasons.

11. For any additional information regarding the above tender, the firms who are interested to quote, may contact office of the undersigned at the office address given below on all working days during office hours (10:30hours to 17:00 hours).

Bangalore Water Supply & Sewerage Board
Office of Chief Engineer (Waste Water Management-E)
5th Floor, Cauvery Bhavan,
K.G.Road, Bangalore.
Telefax:080-22945106

12. Tenderers shall submit offers that comply with the requirements of the bid document.

13. The successful bidder has to follow Solid waste management rule(SWM)2016 for this tender work

Corrigendum / Modification / Corrections, if any will be published in the website only.

Sd/-

Chief Engineer
(Waste Water Management-E)

SECTION 2:

INSTRUCTIONS TO TENDERERS (ITT)

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A. General

1. Scope of Tender

1.1 The **Chief Engineer (WWM-E),**(Referred to as Employer in these documents) invites tenders following Two Stage Karnataka Public Procurement Portal procedure, from eligible Tenderers **Work of Comprehensive Operation and Maintenance of 6 MLD STP at Kadugodi for the period of Four Years.**(as defined in these documents and referred to as "the work") detailed in the Table given in the Invitation for Tenders (IFT).

2. Eligible Tenderers

2.1 Tenderers shall not be under a declaration of ineligibility for corrupt and fraudulent practices issued by the Government of Karnataka

2.2 Tenders from Joint ventures are not acceptable.

3. Qualification of the Tenderer:

3.1 All Tenderers shall provide the requested information accurately and in sufficient detail in Section 3: Qualification information.

3.2 To qualify for award of this contract, each Tenderer in its name should have in the last five years i.e. 2019-20 to 2023-2024)

a) Achieved in at least two financial years a minimum financial turnover (in all classes of civil engineering construction works only) **Rs.393.125 Lakh.**

b) As a Prime Contractor, the tenderer should have satisfactorily completed at least one similar work of Operation and Maintenance of Sewage Treatment Plant based on Sequencing Batch Reactor with Disc/ Sand filtration of value not less than **Rs.463.885 lakh** in the last five financial years.

c) The tenderer should have executed in any Two financial year Operational & maintenance of MLD capacity Sewage Treatment Plant (STP) in the last five financial years.

d) The tenderer should have executed operation and maintenance of STP's meeting all effluent parameters as per Hon'ble National Green Tribunal norms.

3.3 Each Tenderer should further demonstrate:

i) Liquid assets and /or availability of credit facilities of no less than **Rs. 57.98 lakh** (Credit lines/letter of credit/certificates from Nationalized / Schedule banks in India for meeting the fund requirement etc.)

3.4 To qualify for a package of contracts made up of this and other contracts for which tenders are invited in this IFT, the tenderer must demonstrate having experience and resources to meet the aggregate of the qualifying criteria for the individual contracts.

3.5 Sub-contractors experience and resources shall not be taken into account in determining the Tenderers compliance with the qualifying criteria except to the extent stated in 3.2 above.

3.6 Tenderers who meet the above specified minimum qualifying criteria, will only be qualified, if their available tender capacity is more than the total tender value. The available tender capacity will be calculated as under:

Assessed available tender capacity = (A*N*1.5 - B)>= Rs. 927.77 Lakh (Amount put to tender including GST@18%)

where

A = Maximum value of civil engineering works executed in any one year during the last five years (updated to 2022-23price level at 10% per year) taking into account the completed as well as works in progress.

N = Number of years prescribed for completion of the works for which tenders are invited.

B = Value, at 2022-23 price level, of existing commitments and on-going works to be completed during the next **48** months**.**

Note: The statements showing the value of existing commitments and on-going works as well as the stipulated period of completion remaining for each of the works listed should be countersigned by the Employer in charge, not below the rank of an Executive Engineer or equivalent.

3.7 Even though the Tenderers meet the above criteria, they are subject to be disqualified if they have:

- made misleading or false representations in the forms, statements and attachments submitted in proof of the qualification requirements; and/or
- record of poor performance such as abandoning the works, not properly completing the contract, inordinate delays in completion, litigation history, or financial failures etc.; and/or
- participated in the previous Tender for the same work and had quoted unreasonably high tender prices and could not furnish rational justification.

4. One Tender per Tenderer:

4.1 Each tenderer shall submit only one tender for one package. A tenderer who submits or participates in more than one tender (other than as a sub-contractor or in cases of alternatives that have been permitted or requested) will cause all the proposals with the Tenderer’s participation to be disqualified.

5. Cost of Tendering:

5.1 The tenderer shall bear all costs associated with the preparation and submission

of his tender, and the Employer will in no case be responsible and liable for those
costs.

6. Site visit:

6.1 The Tenderer at his own responsibility and risk is encouraged to visit and examine the Site of Works and its surroundings and obtain all information that may be necessary for preparing the Tender and entering into a contract for construction of the Works. The costs of visiting the Site shall be at the Tenderers own expense.

B. Tender documents

7. Content of Tender documents

7.1 The set of tender documents shall have all the Sections given in Page 2:

7.2 Both the sets should be completed and uploaded with the tender.

8. Clarification of Tender Documents

8.1 A prospective tenderer requiring any clarification of the tender documents may notify the Employer by posting in the web site (Karnataka Public procurement→Mytenders→action→queries). No identity of the participating tenderer shall be mentioned in the query. All queries& replies can be viewed by all participating tenderers.

8.2 Pre-tender meeting: ***Deleted***

9. Amendment of Tender documents

9.1 Before the deadline for submission of tenders, the Employer may modify the tender documents by issuing addenda.

9.2 Any addendum thus issued shall be part of the tender documents and shall be posted in the Karnataka Public Procurement website for viewing by all the purchasers of the tender documents.

9.3 To give prospective Tenderers reasonable time in which to take an addendum into account in preparing their tenders, the Employer shall extend as necessary the deadline for submission of tenders, in accordance with Sub-Clause 16.2 below.

C. Preparation of Tenders

10. Documents comprising the Tender

10.1.1The tender submitted in Karnataka Public Procurement Portal by the Tenderer shall contain the
documents as follows:

a) Scanned copy of Earnest Money Deposit.
b) The form of Tender (in the format indicated in Section 4)
c) Scanned copies of the certificates supporting the Qualification as in Section 3. Any other materials required to be completed and

submitted by Tenderers in accordance with these instructions. The documents listed under Sections 3, 4, 6 and 9 shall be filled in without exception. PHOTOCOPIES OF THE DOCUMENTS SHOULD BE NOTARISED.

10.1.2 Rates for the Bill of Quantities (Section 9) shall be quoted at the provision made in
the Karnataka Public Procurement website Portal.

10.2 Tenderers submitting tenders together with other contracts stated in the IFT to
form a package will so indicate in the tender together with any discounts offered
for the award of more than one contract.

11. Tender prices

11.1 The contract shall be for the whole works as described in Sub-Clause 1.1, based on
the priced Bill of Quantities submitted by the Tenderer.

11.2 The Tenderer shall fill in the unit rates in figures for all items of the Works described in the Bill of Quantities. The system will automatically calculate the amount of that item as well as the total Tender value. ***Items for which no rate is entered by the Tenderer will not be paid for by the Employer when executed and shall be deemed covered by the other rates in the Bill of Quantities***

11.3 All duties, taxes, and other levies payable by the contractor under the contract, or for any other cause, shall be included in the rates, prices and total Tender Price submitted by the Tenderer.

11.4 DELETED

12. Tender validity

12.1 Tenders shall remain valid for a period not less than **ninety days** after the deadline date for tender submission specified in Clause 16. A tender valid for a shorter period shall be rejected by the Employer as non-responsive.

12.2 In exceptional circumstances, prior to expiry of the original time limit, the Employer may request that the Tenderers may extend the period of validity for a specified additional period. The request and the Tenderers responses shall be made in writing or e-mail. A Tenderer may refuse the request without forfeiting his earnest money deposit. A Tenderer agreeing to the request will not be required or permitted to modify his tender, but will be required to extend the validity of his earnest money deposit for a period of the extension, and in compliance with Clause13 in all respects.

13. Earnest money deposit

13.1 Earnest Money Deposit shall be paid through Karnataka Public Procurement Portal only using any of the following four modes.

i. Credit Card (Online Payment)
ii. Direct Debit Using Internet Banking (Online Payment)
iii. Remittance at the Bank Counter - Challan (Offline Payment)
iv. NEFT (Offline payment).

13.2 Instruments having fixed validity issued as earnest money deposit for the tender shall be valid for 45 days beyond the validity of the tender.

13.3 Any tender not accompanied by an acceptable earnest money deposit and not secured as indicated in Sub-Clauses 13.1 and 13.2 above shall be rejected by the Employer as non-responsive.

13.4 The earnest money deposit of unsuccessful Tenderers will be returned within 30days of the end of the tender validity period specified in Sub-Clause 12.1.

13.5 The earnest money deposit of the successful Tenderer will be discharged when the Tenderer has signed the Agreement and furnished the required Performance Security.

13.6 The Earnest money deposit may be forfeited:

a) if the Tenderer withdraws the Tender after tender opening during the period of tender validity;
b) if the Tenderer does not accept the correction of the Tender Price, pursuant to Clause 24; or
c) in the case of a successful Tenderer, if the Tenderer fails within the specified time limit to
   (i) Sign the Agreement; or
   (ii) Furnish the required Security deposit

14. Format and signing of Tender

14.1 The completed tender comprising of documents indicated in ITT 10, should be uploaded in the Karnataka Public Procurement website along with scanned copies of requisite certificates those are mentioned in different sections in the bid document and scanned copy of tender Security / EMD.

14.2 All the documents should be uploaded in Karnataka Public Procurement website. Tenderer should take a print out of the Form of Tender in the Section 4 of the tender document on company letter head and should sign, stamp and upload the same to the tender. Authenticity of the singing authority shall be furnished. With this, it is taken that tenderer has signed & submitted the tender.

14.3 The Tender shall contain no alterations or additions, except those to comply with instructions issued by the Employer.

D. Submission of Tenders

15. Up-loading & submission of tenders

15.1 The tenders should be uploaded only through Karnataka Public Procurement Website. Tender should contain

A. Technical Tender consisting of following:

a. All the documents with required details in prescribed format; those are mentioned in different sections in the Tender. Form of Tender, etc., shall be downloaded, filled with required details, signed, scanned& uploaded to the Karnataka Public Procurement Portal (www.kppp.gov.in)

b. The above documents along with notarized copies of documentary evidences as indicated in Section—2 of ITT, Section-3 Qualification information & Section-4 Forms of Tender shall be scanned and uploaded to the website compulsorily, failing which tender will be rejected in view of incomplete tender document and

B. Financial Tender consisting ofBill of Quantities

15.1 All rates for the items in the Schedule shall be posted in the work template provided in the tender document. Rates shall be entered in figures only.

15.2 DELETED

15.3 BID reference Number will be automatically generated by the server.

15.4 DELETED

16. Deadline for submission of the Tenders

16.1 DELETED.

16.2 The Employer may extend the deadline for submission of tenders by issuing an amendment in accordance with Clause 9, in which case all rights and obligations of the Employer and the Tenderers previously subject to the original deadline will then be subject to the new deadline.

17. Late Tenders

17.1 The software of Karnataka Public Procurement website system will not allow the Tenderer to upload the documents after expiration of the stipulated date & time of Bid submission. The Tenderer shall refer the server time, which will be displayed in the Karnataka Public Procurement Portal. BWSSB will not be responsible for non-receipt of bids on the stipulated date & time prescribed in clause 16, due to Internet Problems, improper uploading or any other related problems. In case of connectivity problems, Tenderer may contact Helpdesk of the Karnataka Public Procurement Portal service provider and may also draw the attention of tender inviting authority.

18. Modification and Withdrawal of Tenders

18.1 Tenderers may “modify” and “withdraw” their tenders multiple numbers of times, until the deadline for submission of tenders by operating the relevant provision made in Karnataka Public Procurement Portal. If the Tenderer withdraws the tender before the deadline for submission of tenders and later if he is interested to submit the tender once again, may do so within the stipulated date & time as mentioned in Clause 16. In this case within the stipulated date & time, the tenderer can once again submit the requisition to the officer inviting tenders for access to the withdrawn tender document for resubmission. For this tenderer need not make any additional payment towards the cost of tender document.Communication of modification / withdrawal by other means will not be accepted.

18.2 DELETED

18.3 No Tender may be modified after the deadline for submission of Tenders.

18.4 Withdrawal or modification of a Tender between the deadline for submission of Tenders and the expiration of the original period of Tender validity specified in Clause 12.1 above or as extended pursuant to Clause 12.2 may result in the forfeiture of the earnest money deposit pursuant to Clause 13.

18.5 DELETED

E. <u>Tender opening and evaluation</u>

19. Opening of Technical Bid of Tenders and evaluation to determine qualified Tenderers:

19.1 The Employer will open the Technical details of all the Tenders received (except those withdrawn), including modifications made pursuant to Clause 18, in the presence of the Tenderers or their representatives who choose to attend at the Employer's office mentioned in the earlier para at 16:00 hours on the date and the place specified. In the event of the specified date of Tender opening being declared a holiday for the Employer, the Tenders will be opened at the appointed time and location on the next working day.

19.2 WITHDRAWAL proposal submitted pursuant to clause 18 shall be read out first and their bids shall not be opened.

19.3 The Tenderers names, the presence or absence of earnest money deposit (amount, format and validity), the submission of qualification information and such other information as the Employer may consider appropriate will be announced by the Employer at the opening.

19.4 The Employer shall prepare minutes of the Tender opening, including the information disclosed to those present in accordance with Sub-Clause 19.3.

19.5 The Price Tenders of all the Tenderers including modifications for financial tenders cannot be opened as this is programmed to open later after evaluation of the Technical details of the participating Tenderers.

19.6 The Employer will evaluate and determine whether each tender (a) meets the eligibility criteria defined in ITT Clause 2; (b) is accompanied by the required earnest money deposit as per stipulations in ITT Clause and (c) meets the minimum qualification criteria stipulated in ITT Clause 3. The Employer will draw out a list of qualified Tenderers.

20. Opening of Financial Bid of qualified Tenderers and evaluation:

20.1 The Employer will inform all the Qualified Tenderers the time, date and venue fixed for the opening of the price Tenders. The Employer will open the price tender of Qualified Tenderers at the appointed time and date in the presence of the Tenders or their representatives who choose to attend. In the event of the specified date of Price tender opening being declared a holiday for the Employer, the price tenders will be opened at the appointed time and location on the next working day.

20.2 DELETED

20.3 The Tenderers' names, the Tender prices, the total amount of each Tender, any discounts, and withdrawals, and such other details as the Employer may consider appropriate, will be announced by the Employer at the opening. No Tender shall be rejected at Tender opening.

20.4 The Employer shall prepare minutes of the Price Tender opening, including the information disclosed to those present in accordance with Sub-Clause 20.3.

21. Process to be confidential

21.1 Information relating to the examination, clarification, evaluation, and comparison of Tenders and recommendations for the award of a contract shall not be disclosed to Tenderers or any other persons not officially concerned with such process until the award to the successful Tenderer has been announced. Any effort by a Tenderer to influence the Employer's processing of Tenders or award decisions may result in the rejection of his Tender.

22. Clarification of Tenders

22.1 To assist in the examination, evaluation, and comparison of Tenders, the Employer may, at his discretion, ask any Tenderer for clarification of his Tender, including breakdowns of unit rates. The request for clarification and the response shall be in writing but no change in the price or substance of the Tender shall be sought, offered, or permitted except as required to confirm the correction of arithmetic errors discovered by the Employer in the evaluation of the Tenders in accordance with Clause 24.

22.2 Subject to sub-clause 22.1, no Tenderer shall contact the Employer on any matter relating to its Tender from the time of the Tender opening to the time the contract is awarded. If the Tenderer wishes to bring additional information to the notice of the Employer, it should do so in writing.

22.3 Any effort by the Tenderer to influence the Employer in the Employer’s Tender evaluation, Tender comparison or contract award decisions may result in the rejection of the Tenderers’ Tender.

23. Examination of Tenders and determination of responsiveness

23.1 Prior to the detailed evaluation of Tenders, the Employer will determine whether each Tender; (a) has been properly signed; and; (b)

is substantially responsive to the requirements of the Tender documents like (a)Form of Tender, (b)Declaration statement Scanned/ uploaded [including documents those are required to be furnished as per Section 2, 3 & 4 of the tender,]; (c) is accompanied by the required securities and; (d) is substantially responsive to the requirements of the tendering documents.

23.2 A substantially responsive Tender is one which conforms to all the terms, conditions, and specifications of the Tender documents, without material deviation or reservation. A material deviation or reservation is one (a) which affects in any substantial way the scope, quality, or performance of the Works; (b) which limits in any substantial way, inconsistent with the Tender documents, the Employer's rights or the Tenderer's obligations under the Contract; or (c) whose rectification would affect unfairly the competitive position of other Tenderers presenting substantially responsive Tenders.

23.3 If a Tender is not substantially responsive, it will be rejected by the Employer, and may not subsequently be made responsive by correction or withdrawal of the non conforming deviation or reservation.

24. Correction of errors

24.1 Once the Tenderer key in the rates in figures, in the Bill of quantities provided, the system will automatically calculate the amount of that item as well as the total Bid value.

24.2 Deleted

25. Evaluation and comparison of Tenders

25.1 The Employer will evaluate and compare only the Tenders determined to be substantially responsive in accordance with Clause 23.

25.2 In evaluating the Tenders, the Employer will determine for each Tender the evaluated Tender Price by adjusting the Tender Price as follows:

(a) Making any correction for errors pursuant to Clause 24; and

(b) DELETED

25.3 The Employer reserves the right to accept or reject any variation, deviation, or alternative offer. Variations, deviations, and alternative offers and other factors which are in excess of the requirements of the Tender documents or otherwise result in unsolicited benefits for the Employer shall not be taken into account in Tender evaluation.

25.4 DELETED

25.5 If the tender of the successful tenderer is seriously unbalanced in relation to the Employer's estimate of the cost of the work to be performed under the contract, the Employer may require the Tenderer to produce detailed price analyses for any or all items of the Bill of Quantities, to demonstrate the internal consistency of those prices with the construction methods and schedule proposed. After evaluation of the price analyses, the Employer may require that the amount of the performance security set forth in Clause 29 be increased at the expense of the successful Tenderer to a level sufficient to protect the Employer against financial loss in the event of default of the successful under the contract.

F. Award of Contract

26. Award criteria

26.1 Subject to Clause 27, the Employer will award the Contract to the Tenderer whose Tender has been determined to be substantially responsive to the Tender documents and who has offered the lowest evaluated Tender Price, provided that such Tenderer has been determined to be (a) eligible in accordance with the provisions of Clause 2, and (b) qualified in accordance with the provisions of Clause 3.

27. Employer's right to accept any Tender and to reject any or all Tenders

27.1 Notwithstanding Clause 26, the Employer reserves the right to accept or reject any Tender, and to cancel the Tender process and reject all Tenders, at any time prior to the award of Contract, without thereby incurring any liability to the affected Tenderer or Tenderers or any obligation to inform the affected Tenderer or Tenderers of the grounds for the Employer's action.

28. Notification of award and signing of Agreement

28.1 The Tenderer whose Tender has been accepted will be notified of the award by the Employer prior to expiration of the Tender validity period by writing, e-mail or by registered letter. This letter (hereinafter and in the Conditions of Contract called the "Letter of Acceptance") will state the sum that the Employer will pay the Contractor in consideration of the execution, completion, and maintenance of the Works by the Contractor as prescribed by the Contract (hereinafter and in the Contract called the "Contract Price").

28.2 The notification of award will constitute the formation of the Contract, subject only to the furnishing of Security deposit in accordance with the provisions of Clause 29.

28.3 The Agreement will incorporate all agreements between the Employer and the successful Tenderer. It will be kept ready for signature of the successful Tenderer in the office of Employer within 30 days following the notification of award along with the Letter of Acceptance. Within 20 days of receipt, the successful Tenderer will sign the Agreement and deliver it to the Employer.

28.4 Upon the furnishing by the successful Tenderer of the Performance Security, the Employer will promptly notify the other Tenderers that their Tenders have been unsuccessful.

29. Security deposit

29.1 Within 20 days of receipt of the Letter of Acceptance, the successful Tenderer shall deliver to the Employer a Security deposit in any of the forms given below for an amount equivalent to 5% of the Contract price plus additional security for unbalanced tenders in accordance with Clause 25.5 of ITT and Clause 44 of the Conditions of Contract. :

- A bank guarantee in the form given in Section 10;

29.2 If the security deposit is provided by the successful Tenderer in the form of a Bank Guarantee, it shall be issued either by a Nationalized/Scheduled bank and valid in accordance with Clause 43 of Condition of Contract.

29.3 DELETED

29.4 Failure of the successful Tenderer to comply with the requirements of Sub-Clause 29.1 shall constitute sufficient grounds for cancellation of the award and forfeiture of the Earnest money deposit.

30. DELETED

31. Corrupt or Fraudulent practices

31.1 The GOK requires that the Tenderers/Suppliers/Contractors, observe the highest standard of ethics during the procurement and execution of such contracts. In pursuance of this policy, GOK :

a) will reject a proposal for award if it determines that the Tenderer recommended for award has engaged in corrupt or fraudulent practices in competing for the contract in question;

b) will declare a firm ineligible, either indefinitely or for a stated period of time, to be awarded a GOK contract if it at any time determines that the firm has engaged in corrupt or fraudulent practices in competing for, or in executing, a GOK contract.

31.2 Furthermore, Tenderers shall be aware of the provision stated in sub-clause 50.2 of the Conditions of Contract.

Sd/-

Chief Engineer

(Waste Water Management-E)

SECTION 3:

QUALIFICATION INFORMATION

The following form is to be downloaded, particulars are to be filled, scanned & uploaded by the Tenderer.

The information to be filled in by the Tenderer hereunder will be used for purposes of computing Tender capacity as provided for in Clause 3 of the Instructions to Tenderers. This information will not be incorporated in the Contract.

1.1 Constitution or legal status of Tenderer [Attach copy]

Place of Registration _____

(Attach Copy)

Principal place of business: _____

1.2 Total value of civil engineering construction works executed and payments received in the last five years (in Rs. Lakh) [attach certificate of Chartered accountant]

2019 – 20 _____

2020– 21 _____

2021– 22 _____

2022 – 23 _____

2023 - 24 _____

1.3 Work performed as Prime Contractor (in the same name) on works of similar nature over during the five years specified in 1.2 above.

Project Name	Name of Employer	Description of Work	Contract Number	Value of contract Rs. Lakh	Date of issue of work ord	Specified period of completion	Actual date of completion	Remarks explaining reasons for delay in completion of work

					er			
1	2	3	4	5	6	7	8	9

1.4 Quantities of work executed as prime contractor (in the same name) during the last five years specified in 1.2 above: [to support the qualification criteria in ITT clause 3]

Year	Name of Work	Name of Employer	Quantity of work performed (cum)		Remarks (Indicate contract reference)

1.5 Information on works for which Tenders have been submitted and works which are yet to be completed as on the date of this Tender.

(A) <u>Existing commitments and on-going works:</u>

Description of Work	Place& State	Contract No. & Date	Name and Address of Employer	Value of Contract (Rs. Lakh)	Stipulated period of completion	Value of works remaining to be completed (Rs. Lakh)	Anticipated date of completion

1	2	3	4	5	6	7	8

(B) Works for which Tenders already submitted:

Description of Work	Place & State	Name and Address of Employer	Estimated value of works (Rs. Lakh)	Stipulated Date period of completion	when decision is expected	Remarks if any
1	2	3	4	5	6	7

1.6 Items of equipment essential for carrying out the works.

Item of Equipment	Requirement			Owned and available		Remarks
	No.	Capacity	Owned	Number/ Capacity	Age/ Condition	

1.7 Reports on the financial standing of the tenderer, such as profit and loss statements and auditor’s reports for the last five years;

1.8 Qualification and experience of the key technical and management personnel in permanent employment with the tenderer and those that are proposed to be deployed on this contract, if awarded.

1.9. Name, address, and telephone, telex, and fax numbers of the Tenderers' bankers who may provide references if contacted by the Employer.

1.10 Evidence of access to financial resources to meet the qualification requirement specified in ITT Clause3.3 (b): Cash in hand, Letter of Credit etc. List them below and attach certificate from the Banker in the suggested format as under:

BANKER'S CERTIFICATE

This is to certify that M/s. ..... is a reputed company with a good financial standing. If the contract for this work, namely ..... (name of the work) is awarded to the above firm, we shall be able to provide overdraft/credit facilities to the extent of Rs. ..... to meet the working capital requirements for executing the above contract

Sd/-
Name of the Bank, Senior Bank Manger
Address:.....

1.11 Proposals for subcontracting components of works amounting to more than 20% of the contract price .

Item of Work	Value of Sub-Contract	Identified Sub-Contractor (Name and address)	Experience of similar work

1.12 Information on litigations in which the Tenderer is involved:

Other Party (ies)	Employer	Details of dispute	Amount involved	Remarks showing present status

1.13 The proposed methodology and program of construction, backed with equipment planning and deployment, duly supported with broad calculations and quality control procedures proposed to be adopted, justifying their capability of execution and completion of the work as per technical specifications within the stipulated period of completion as per milestones.

Sd/-

Chief Engineer

(Waste Water Management-E)

SECTION 4:

[Tenderer shall down load this page, print on the letter head, fill the gaps with signature, scan the sheet & upload to the website. Failing which the tender will be treated as non-responsive]

FORMS OF TENDER, LETTER OF ACEPTANCE, NOTICE TO PROCEED WITH THE WORK AND AGREEMENT FORM

Form of Tender

Description of the Work: Work of Comprehensive Operation and Maintenance of 6 MLD UWTP at Kadugodi for the period of 4 years.

To

The Chief Engineer (Waste Water Management-E)
Bangalore Water Supply & Sewerage Board
5th Floor, Cauvery Bhavan D-Block,
K.G. Road, Bangalore 560009

GENTLEMEN,

We offer to execute the Works described above in accordance with the Conditions of Contract accompanying this Tender for the Contract Price uploaded for this tender to be opened after qualification.

This Tender and your written acceptance of it shall constitute a binding contract between us. We understand that you are not bound to accept the lowest or any Tender you receive.

We undertake that, in competing for (and, if the award is made to us, in executing) the above contract, we will strictly observe the laws against fraud and corruption in force in India namely “Prevention of Corruption Act 1988”.

We hereby confirm that this Tender complies with the Tender validity and Earnest money deposit required by the Tender documents.

We attach herewith our current income-tax clearance certificate.

Yours faithfully,

Authorized Signature:

Name & Title of Signatory:

_____

Name of Tenderer _____

Address: ----------

Letter of Acceptance

(letterhead paper of the Employer)

_____[date]

To: _____[name and address of the Contractor]

Dear Sirs,

This is to notify you that your Tender dated _____ for execution of the _____[name of the contract and identification number, as given in the Instructions to Tenderers] for the Contract Price of Rupees _____ —— _____ (_____) [amount in words and figures], as corrected and modified in accordance with the Instructions to Tenderers is hereby accepted by our Agency.

You are hereby requested to furnish Security deposit plus additional security for unbalanced tenders in terms of Clause 25.5 of ITT, in the form detailed in Clause 29.1 of ITT for an amount of Rs.——————— within 20 days of the receipt of this letter of acceptance valid up to 30 days from the date of expiry of Defects Liability Period i.e. up to ..... and sign the contract, failing which action as stated in Para 29.4 of ITT will be taken.

Yours faithfully,

Authorized Signature
Name and Title of Signatory
Name of Agency

Issue of Notice to proceed with the work

(letterhead of the Employer)

———— (date)

To

————————————————— (name and address of the Contractor)

—————————————————

—————————————————

Dear Sirs:

Pursuant to your furnishing the requisite security deposit as stipulated in ITT Clause 29.1 and signing of the contract agreement for the construction of ————————[name of the contract] a Tender Price of Rs.————————, you are hereby instructed to proceed with the execution of the said works in accordance with the contract documents.

Yours faithfully,

(Signature, name and title of signatory authorized to sign on behalf of Employer)

Agreement Form

Agreement

This agreement, made the _____day of _____20_____, between_____ _____[name and address of Employer] (hereinafter called "the Employer") of the one part and _____ _____ _____ __ _____[name and address of contractor] (hereinafter called "the Contractor") of the other part.

Whereas the Employer is desirous that the Contractor execute _____ _____[name and identification number of Contract] (hereinafter called "the Works") and the Employer has accepted the Tender by the Contractor for the execution and completion of such Works and the remedying of any defects therein at a contract price of Rupees.....

NOW THIS AGREEMENT WITNESSETH as follows:

1. In this Agreement, words and expression shall have the same meanings as are respectively assigned to them in the Conditions of Contract hereinafter referred to, and they shall be deemed to form and be read and construed as part of this Agreement.

2. In consideration of the payments to be made by the Employer to the Contractor as hereinafter mentioned, the Contractor hereby covenants with the Employer to execute and complete the Works and remedy any defects therein in conformity in all aspects with the provisions of the Contract.

3. The Employer hereby covenants to pay the Contractor in consideration of the execution and completion of the Works and the remedying the defects wherein the Contract Price or such other sum as may become payable under the provisions of the Contract at the times and in the manner prescribed by the Contract.

4. The following documents shall be deemed to form and be read and construed as part of this Agreement, viz:

i) Letter of Acceptance;
ii) Notice to proceed with the works;
iii) Contractor's Tender;
iv) Contract Data;
v) Conditions of contract (including Special Conditions of Contract);
vi) Specifications;
vii) Drawings;
viii) Bill of Quantities; and
ix) Any other document listed in the Contract Data as forming part of the contract.

Whereas, the parties now mutually agree to the following conditions of Contract.

5. Jurisdiction of Courts/Arbitration: The Sitting of arbitration shall be held at Bangalore only and nowhere else.

6. Dispute of any kind arising out of the contract shall be resolved within the jurisdiction of Bangalore city only and the parties agree and clearly understand that the courts/ tribunals situated at Bangalore Metropolitan City have exclusive jurisdiction for the redressal of the disputes arising out of the contract and at no other place.

7. The parties further agree and understand that the place or places of issue of bank guarantee other than Bangalore will have no jurisdiction to resolve dispute of any kind relating to enforcement of the bank guarantees submitted by the contractor at Bangalore for the execution of the contract at Bangalore.

8. The contractor shall comply with all the legal requirements in the matter of employment of workmen and provide all safety gadgets to the workmen

while working in the hazards place of conditions during the execution of the contract.

9. Contractor shall be fully responsible in the event of death of employee/ workman during the execution of the work and liable to pay adequate compensation to the dependents of employee/ workman as per law.

10. On his/ their failure, if the Board is made to pay compensation the same shall be recovered by the Board from the contractor out of the amounts due to the contractor or by appropriate legal action.
11. If death of any employees occurs during execution of work due to negligence of contractor, the contract will be liable for termination.

12. In the event of such termination, the employer may consider blacklisting of firm after due notice.

13. In case of any death or accident the contract will be cancelled after following due process.

14. The Board will be entitled to claim exemplary damages from the contractor in case of death of any work man / employees of the contractor in any of the BWSSB works as it damages the reputation of

In witness whereof the parties thereto have caused this Agreement to be executed the day and year first before written.

The Common Seal of _____
was hereunto affixed in the presence of:

Signed, Sealed and Delivered by the said _____
in the presence of:

Binding Signature of Employer _____

Binding Signature of Contractor _____

SECTION 5: CONDITIONS OF CONTRACT

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Conditions of Contract

A. General

1. Definitions

1.1 Terms which are defined in the Contract Data are not also defined in the Conditions of Contract but keep their defined meanings. Bold letters are used to identify defined terms.

Bill of Quantities means the priced and completed Bill of Quantities forming part of the Tender.

Compensation events are those defined in Clause 38 hereunder.

The **Completion Date** is the date of completion of the Works as certified by the Employer in accordance with Sub Clause 46.1.

The **Contract** is the contract between the Employer and the Contractor to execute, complete and maintain the Works. It consists of the documents listed in Clause 2.2 below.

The **Contract Data** defines the documents and other information which comprise the Contract.

The **Contractor** is a person or corporate body whose Tender to carry out the Works has been accepted by the Employer.

The **Contractor's Tender** is the completed Tender document submitted by the Contractor to the Employer.

The **Contract price** is the price stated in the Letter of Acceptance and thereafter as adjusted in accordance with the provisions of the Contract.

Days are calendar days; months are calendar months.

A **Defect** is any part of the Works not completed in accordance with the Contract.

The **Defects liability period** is the period named in the Contract Data and calculated from the Completion Date.

The **Employer** is the party who will employ the Contractor to carry out the Works.

Equipment is the Contractor's machinery and vehicles brought temporarily to the Site to construct the Works.

The **Initial Contract price** is the Contract Price listed in the Employer's Letter of Acceptance.

The **Intended Completion Date** is the date on which it is intended that the Contractor shall complete the Works. The Intended Completion Date is specified in the Contract Data. The Intended Completion Date may be revised only by the Employer by issuing an extension of time.

Materials are all supplies, including consumables, used by the contractor for incorporation in the Works.

Plant is any integral part of the Works which is to have a mechanical, electrical, electronic or chemical or biological function.

The **Site** is the area defined as such in the Contract Data.

Specification means the Specification of the Works included in the Contract and any modification or addition made or approved by the Employer.

The **Start Date** is given in the Contract Data. It is the date when the Contractor shall commence execution of the works. It does not necessarily coincide with any of the Site Possession Dates.

A **Subcontractor** is a person or corporate body who has a Contract with the Contractor to carry out a part of the work in the Contract which includes work on the Site.

A **Variation** is an instruction given by the Employer which varies the Works.

The **Works** are what the Contract requires the Contractor to construct, install, and turn over to the Employer, as defined in the Contract Data.

2. Interpretation

2.1 In interpreting these Conditions of Contract, singular also means plural, male also means female or neuter, and the other way around. Headings have no significance. Words have their normal meaning under the language of the Contract unless specifically defined. The Employer will provide instructions clarifying queries about the Conditions of Contract.

2.2 The documents forming the Contract shall be interpreted in the following order of priority:

(1) Agreement
(2) Letter of Acceptance, notice to proceed with the works
(3) Contractor’s Tender
(4) Contract Data
(5) Conditions of Contract
(6) Specifications
(7) Drawings
(8) Bill of quantities and
(9) any other document listed in the Contract Data as forming part of the Contract.

3. Law governing contract

3.1 The law governing the Contract is the Laws of India supplanted by the Karnataka Local Acts.

4. Employer's decisions

4.1 Except where otherwise specifically stated, the Employer will decide contractual matters between the Employer and the Contractor.

5. Delegation

5.1 The Employer may delegate any of his duties and responsibilities to other people after notifying the Contractor and may cancel any delegation after notifying the Contractor.

6. Communications

6.1 Communications between parties which are referred to in the conditions are effective only when in writing. A notice shall be effective only when it is delivered (in terms of Indian Contract Act).

7. Subcontracting

7.1 The Contractor may subcontract with the approval of the Employer but may not assign the Contract without the approval of the Employer in writing. Subcontracting does not alter the Contractor's obligations.

8. Other Contractors

8.1 The Contractor shall cooperate and share the Site with other contractors, public authorities, utilities, and the Employer.

9. Personnel

9.1 The Contractor shall employ the technical personnel (of number and qualifications) as may be stipulated by GOK from time to time during the execution of the work. The technical staff so employed shall be available at site as may be stipulated by the Employer.

9.2 If the Employer asks the Contractor to remove a person who is a member of the Contractor’s staff or his work force stating the reasons, the Contractor shall ensure that the person leaves the Site within seven days and has no further connection with the work in the Contract.

10. Employer’s and Contractor's risks

10.1 The Employer carries the risks which this Contract states are Employer’s risks, and the Contractor carries the risks which this Contract states are Contractor’s risks.

11. Employer's risks

11.1 The Employer is responsible for the excepted risks which are:

(a) Rebellion, riot commotion or disorder unless solely restricted to employees of the Contractor or his Sub-Contractors arising from the conduct of the Works; or

(b) A cause due solely to the design of the Works, other than the Contractor’s design; or

(c) any operation of the forces of nature (in so far as it occurs on the Site) which an experienced contractor:

(i) could not have reasonably foreseen; or

(ii) could reasonably have foreseen, but against which he could not reasonably have taken at least one of the following measures;

(A) prevent loss or damage to physical property from occurring by taking appropriate measures or

(B) insure against such loss or damage

12. Contractor’s risks

12.1 All risks of loss of or damage to physical property and of personal injury and death which arise during and in consequence of the performance of the Contract other than the excepted risks are the responsibility of the Contractor.

13. Insurance:

13.1 The Contractor shall prior to commencing the works, effect and thereafter maintain insurances, in the joint names of the Employer and the

Contractor, (cover from the first working day after the Start Date to the end of Defects Liability Period), in the amounts stated in the Contract Data :

(a) for loss of or damage to the Civil Works, Electrical , Mechanical , Plants and Materials and the Contractor's equipment;

(b) for liability of both Parties for loss, damage, death and injury to third parties or their property arising out of the Contractor's performance of the Contract including the Contractor's liability for damage to the Employer's property other than the Works and

(c) for liability of both Parties and of any Employer's representative for death and injury to the Contractor's personnel except to the extent that liability arises from the negligence of the Employer, any Employer's representative or their Employees.

13.2 Policies and certificates for insurance shall be delivered by the Contractor to the Employer for his approval before the Start Date. All such insurance shall provide for compensation to be payable to rectify the loss or damage incurred. All payments received from insurers relating to loss or damage shall be held jointly by the Parties and used for the repair of the loss or damage or as compensation for loss or damage that is not to be repaired.

13.3 If the Contractor fails to effect or keep in force any of the insurances referred to in the previous sub-clauses or fails to provide satisfactory evidence, policies or receipts, the Employer may without prejudice to any other right or remedy, effect insurance for the cover relevant to such default and pay the premiums due and recover the same as a deduction from any other monies due to the Contractor. If no payments is due, the payment of the premiums shall be a debt due.

13.4 Alterations to the terms of an insurance shall not be made without the approval of the Employer.

13.5 Both Parties shall comply with any conditions of the insurance policies.

14. Site Investigation Reports:

14.1 The Contractor, in preparing the tender, shall rely on any site investigation reports referred to in the Contract data, supplemented by any information available to the Tenderer.

15. Queries about the Contract Data

15.1 The Employer will clarify queries on the Contract Data.

16. Contractor to construct the Works

16.1 The Contractor shall construct the Works in accordance with the Specification and Drawings.

17. The Works to be completed by the Intended Completion Date

17.1 The Contractor may commence execution of the Works on the Start Date and shall carry out the Works in accordance with the program submitted by the Contractor, as updated with the approval of the Employer, and complete them by the Intended Completion Date.

18. Approval by the Employer:

18.1 The Contractor shall submit Specification and drawings showing the proposed Temporary Works to the Employer, who is to approve them if they comply with the Specifications and Drawings.

18.2 The Contractor shall be responsible for the design of Temporary Works

18.3 The Employer’s approval shall not alter the Contractor’s responsibility for design of the Temporary Works.

18.4 The Contractor shall obtain approval of third parties to the design of third parties to the design of the temporary Works where required.

18.5 All Drawings prepared by the Contractor for the execution of the temporary or permanent Works, are subject to prior approval by the Employer before their use.

19. Safety

19.1 The Contractor shall be responsible for the safety of all activities on the Site.

20. Discoveries

20.1 Anything of historical or other interest or of significant value unexpectedly discovered on the Site is the property of the Employer. The Contractor is to notify the Employer of such discoveries and carry out the Employer's instructions for dealing with them.

21. Possession of the Site

21.1 The Employer shall give possession of all parts of the Site to the Contractor. If possession of a part is not given by the date stated in the Contract Data the Employer is deemed to have delayed the start of the relevant activities and this will be Compensation Event.

22. Access to the Site

22.1 The Contractor shall allow the Employer and any person authorized by the Employer access to the Site, to any place where work in connection with the Contract is being carried out or is intended to be carried out and to any place where materials or plant are being manufactured / fabricated / assembled for the works.

23. Instructions

23.1 The Contractor shall carry out all instructions of the Employer which comply with the applicable laws where the Site is located.

24. Procedure for resolution of Disputes:

24.1 If the Contractor is not satisfied with the decision taken by the Employer, the dispute shall be referred by either party to Arbitration within 30 days of the notification of the Employer’s decision.

24.2 If neither party refers the dispute to Arbitration within the above 30 days, the Employer’s decision will be final and binding.

24.3 The Arbitration shall be conducted in accordance with the arbitration procedure stated in the Special Conditions of Contract.

B. Time Control

25. Program

25.1 Within the time stated in the Contract Data the Contractor shall submit to the Employer for approval a Program showing the general methods, arrangements, order, and timing for all the activities in the Works.

25.2 The Employer's approval of the Program shall not alter the Contractor's obligations. The Contractor may revise the Program and submit it to the Employer again at any time. A revised Program is to show the effect of Variations and Compensation Events.

26. Extension of the Intended Completion Date

26.1 The Employer shall extend the Intended Completion Date if a Compensation Event occurs or a Variation is issued which makes it impossible for Completion to be achieved by the Intended Completion Date.

26.2 The Employer shall decide whether and by how much to extend the Intended Completion Date within 21 days of the Contractor asking the Employer for a decision upon the effect of a Compensation Event or Variation and submitting full supporting information.

27. Delays ordered by the Employer

27.1 The Employer may instruct the Contractor to delay the start or progress of any activity within the Works.

28. Management meetings

28.1 The Employer may require the Contractor to attend a management meeting. The business of a management meeting shall be to review the progress achieved and the plans for remaining work.

28.2 The responsibility of the parties for actions to be taken is to be decided by the Employer either at the management meeting or after the management meeting and stated in writing to be distributed to all who attended the meeting.

C. Quality Control

29. Identifying defects

29.1 The Employer shall check the Contractor's work and notify the Contractor of any Defects that are found. Such checking shall not affect the Contractor's responsibilities. The Employer may instruct the Contractor to search for a Defect and to uncover and test any work that the Employer considers may have a Defect

30. Tests

30.1 If the Employer instructs the Contractor to carry out a test not specified in the Specification to check whether any work has a Defect and the test shows that it does, the Contractor shall pay for the test and any samples. If there is no Defect the test shall be a Compensation Event.

31. Correction of defects

31.1 The Employer shall give notice to the Contractor of any Defects before the end of the Defects Liability Period, which begins at Completion and is defined in the Contract Data. The Defects Liability Period shall be extended for as long as Defects remain to be corrected.

31.2 Every time notice of a Defect is given, the Contractor shall correct the notified Defect within the length of time specified by the Employer’s notice.

32. Uncorrected defects

32.1 If the Contractor has not corrected a Defect within the time specified in the Employer's notice, the Employer will assess the cost of having the Defect corrected, and the Contractor will pay this amount.

D. Cost Control

33. Bill of Quantities (BOQ)

33.1 The BOQ shall contain items for the construction, installation, testing, and commissioning work to be done by the Contractor.

33.2 The BOQ is used to calculate the Contract Price. The Contractor is paid for the quantity of the work done at the rate in the BOQ for each item

34. Variations

34.1 The Employer shall have power to order the Contractor to do any or all of the following as considered necessary or advisable during the progress of the work by him

(a) Increase or decrease of any item of work included in the Bill of Quantities (BOQ);
(b) Omit any item of work;
(c) Change the character or quality or kind of any item of work;
(d) Change the levels, lines, positions and dimensions of any part of the work;
(e) Execute additional items of work of any kind necessary for the completion of the works; and
(f) Change in any specified sequence, methods or timing of construction of any part of the work.

34.2 The Contractor shall be bound to carry out the work in accordance with any instructions in this connection, which may be given to him in writing by the Employer and such alteration shall not vitiate or invalidate the contract.

34.3 Variations shall not be made by the Contractor without an order in writing by the Employer, provided that no order in writing shall be required for

increase or decrease in the quantity of an item appearing in the BOQ so long as the work executed conforms to the approved drawings.

34.4 The Contractor shall promptly request in writing the Employer to confirm verbal orders and if no such confirmation is received within 15days of request, it shall be deemed to be an order in writing by the Employer.

35. Payments for Variations

35.1 Payment for increase in the quantities of an item in the BOQ up to 25% of that provided in the Bill of Quantities shall be made at the rates quoted by the Contractor.

35.2 For quantities in excess of 125% of the tendered quantity of an item as given in the BOQ, the Contractor shall be paid at the rate entered in or derived from in the Schedule of Rates (applicable for the area of the work and current at the time of award of contract) plus or minus the overall percentage of the original tendered rates over the current Schedule of Rates prevalent at the time of award of contract.

35.3 If there is no rate for the additional, substituted or altered item of the work in the BOQ, efforts would be made to derive the rates from those given in the BOQ or the Schedule of Rates (applicable for the area of the work and current at the time of award of contract) and if found feasible the payment would be made at the derived rate for the item plus or minus the overall percentage of the original tendered rates over the current Schedule of Rates prevalent at the time of award of contract

35.4 If the rates for additional, substituted or altered item of work cannot be determined either as at 35.1 or 35.2 or 35.3 above, the Contractor shall be requested to submit his quotation for the items supported by analysis of the rate or rates claimed, within 7 days.

35.5 If the Contractor's quotation is determined unreasonable, the Employer may order the Variation and make a change to the Contract Price which shall be based on Employer’s own forecast of the effects of the Variation on the Contractor's costs.

35.6 If the Employer decides that the urgency of varying the work would prevent a quotation being given and considered without delaying the work, no quotation shall be given and the Variation shall be treated as a Compensation Event.

35.7 Under no circumstances the Contractor shall suspend the work on the plea of non-settlement of rates for items falling under this Clause.

36. Submission of bills for payment

36.1 The Contractor shall submit to the Employer monthly bills of the value of the work completed less the cumulative amount paid previously along with necessary supporting documents .

36.2 The Employer shall check the Contractor's bill and determine the value of the work executed which shall comprise of (i) value of the quantities of the items in the BOQ completed and (ii) valuation of Variations and Compensation Events.

36.3 The Employer may exclude any item paid in a previous bill or reduce the proportion of any item previously paid in the light of later information.

37. Payments

37.1 Payments shall be adjusted for deductions for advance payments, other recoveries in terms of the contract and taxes, at source, as applicable under the law. The Employer shall pay the Contractor the within **60 days** of submission of bill. The Contractor shall be liable to pay liquidated damages for shortfall in progress. For Progress beyond the agreed Programme, payment is subject to availability of the grants.

37.2 Items of the Works for which no rate or price has been entered in will not be paid for by the Employer and shall be deemed covered by other rates and prices in the Contract.

38. Compensation events

38.1 The following are Compensation events unless they are caused by the Contractor:

(a) The Employer does not give access to a part of the Site by the Site Possession Date stated in the Contract Data.

(b) The Employer orders a delay or does not issue drawings, specifications or instructions required for execution of works on time.

(c) The Employer instructs the Contractor to uncover or to carry out additional tests upon work which is then found to have no Defects.

(d) The Employer gives an instruction for dealing with an unforeseen condition, caused by the Employer, or additional work required for safety or other reasons.

(e) The effect on the Contractor of any of the Employer’s Risks.

(f) The Employer unreasonably delays issuing a Certificate of Completion.

(g) Other Compensation Events listed in the Contract Data or mentioned in the Contract.

38.2 If a Compensation Event would cause additional cost or would prevent the work being completed before the Intended Completion Date, the Contract Price shall be increased and/or the Intended Completion Date is extended. The Employer shall decide whether and by how much the Contract Price shall be increased and whether and by how much the Intended Completion Date shall be extended.

38.3 As soon as information demonstrating the effect of each Compensation event upon the Contractor's forecast cost has been provided by the Contractor, it is to be assessed by the Employer and the Contract Price shall be adjusted accordingly. If the Contractor's forecast is deemed unreasonable, the Employer shall adjust the Contract Price based on Employer’s own forecast. The Employer will assume that the Contractor will react competently and promptly to the event.

38.4 The Contractor shall not be entitled to compensation to the extent that the Employer's interests are adversely affected by the Contractor not having given early warning or not having cooperated with the Employer.

39. Tax

39.1 Taxes, Duties and other Levies:

a) The selected bidder will be fully responsible for all applicable taxes, duties, license fees, etc. incurred in relation to the work. They must cover the taxes that may be imposed on their own personnel or any of their employees' earnings and will be expected to protect the employer from any potential claims made against them. The selected bidder must indemnify and hold the employer harmless against any such claims.

b) According to Commercial Tax Department Notification No.12/2017, all services are subject to a nil rate of GST under the definition of a pure service. The quoted rate should exclude the GST, which will be charged separately as per the prevailing applicable laws.

c) BWSSB does not assume any responsibility for taxes under the Indian Income Tax Act, 1961 for the selected bidder(s) or their personnel. In accordance with the provisions of the Indian Income Tax Act, 1961, if necessary, BWSSB will make deductions for Income Tax at source. The applicable tax at the prevailing rate will be included over and above the quoted price.

If the Amount put to tender is exclusive of GST

GST and TDS Clause:
Prevailing GST:
The prevailing Goods and Services Tax (GST) rate is 18% as per the current taxation regulations. The GST amount is not included in the bid amount put forward by the bidder but will be applicable in addition to the awarded contract cost.

TDS Deduction:
As per the GST notification, a Tax Deducted at Source (TDS) of 2% shall be deducted by the client while making payments for the bills raised by the bidder.

Submission of Security Deposit:
Upon issuance of the Letter of Award (LOA) at the award cost, including GST, the successful bidder shall be required to submit the entire security deposit, comprising the applicable GST amount as well.

Invoicing and Tax Compliance:
The successful bidder shall adhere to all relevant GST regulations and guidelines while invoicing for the work contract. The invoice/bills provided by the bidder should clearly indicate the applicable GST rate, along with the tax registration details, and comply with all legal requirements as specified by the GST authorities.

Changes in GST Rate:
In the event of any change in the GST rate during the execution of the contract, the responsibility of updating the invoicing and pricing structure to reflect the revised GST rate shall lie with the bidder. The contract shall remain in force, and both parties shall abide by the new GST rate as per the applicable law.

GST Documentation:
The bidder is required to provide all necessary GST-related documentation, such as tax invoices, payment receipts, and any other documents requested by the contracting authority, in a timely and accurate manner.

Any disputes or issues related to GST:
In case of any disputes or issues related to GST compliance, the bidder shall be responsible for resolving such matters with the appropriate tax authorities. The contracting authority shall not bear any liability for any non-compliance or discrepancies related to GST.

This provision is an integral part of the bid document, and all bidders are requested to thoroughly review and acknowledge their understanding and

compliance with the prevailing GST rate of 18% before submitting their bids.

40. Price Adjustment:

A) Price Adjustment Formula for O&M Contract

The amount payable to the Contractor and valued at base prices in accordance with the payment Schedule shall be adjusted for rises or falls in the cost of Labor,Chemicals ,Fuels and other inputs to the Operation and Maintenance of the Plant , by the addition or deduction of the amounts determined by the formulae prescribed in this Sub-Clause. To the extent that full compensation for any rise or fall in costs to the Contractor during Operation and Maintenance is not covered by the provisions of this or any other clause in the Contract, the O & M Contract Price shall be determined to include amounts to cover the contingency of such other rise or fall in costs.

Adjustment Formula: The amount to be added to or deducted from the Interim Payment Certificates for changes in cost and legislation shall be determined from the formulae. The formulae will be of the following general type:

$$P_n = a + b\frac{L_n}{L_o} + c\frac{C_n}{C_o} + dF\frac{n}{F_o} + etc$$

Where :

"**Pn**"is the adjustment factor to be applied to the payment for Operation and Maintenance of the Plant carried out in month "n";
"**a**"is a fixed coefficient, representing the non-adjustment portion;
"**b**","**c**","**d**",etc.,are coefficients representing the estimated proportion of each cost element (labor(L), Chemicals©, Fuel sand lubricants (F), etc.) in the Operation and maintenance of the plant , as specified below;
"**Ln**","**Cn**","**Fn**",etc.,are the current costindicesorreference prices for month"n"towhich the particular Interim Payment Certificate is related;
"**Lo**","**Co**","F**o**",etc.,are the base cost indices or reference prices corresponding to the above cost elements, on the Base Date as defined in the Section below.
The source of indices shall be those listed in the subsequent subparagraphs.

Sources of Indices: The sources of the indices shall be as follows:

TypeofIndex	Source
CostIndexforLabour	The consumer price index for industrial workers aspublishedbythe**ReserveBankofIndia, TableNo.36**forBangalore(Base2012=100)
CostIndexforChemicals	The average whole sale price index for Basic Heavy Inorganic Chemicals, as published by the **ReserveBankofIndia,TableNo.39**for India(Base2004-05=100)

CostIndexFuelsand Lubricants	The average whole sale price index for Fuel, power, light and lubricants, as published by the **Reserve Bank of India,Table o.39** forIndia (Base2004-05=100)

Weighting and Adjustment Factors: The weightings (coefficients) for each of the factors of cost, shall be as follows:

ForO&M Contract

Co-efficient	Description of Co-efficient	Range of Weightings%	Weightings% "BidderstoSpecify below
(a)	Fixed Co-efficient	20	20
(b)	Labour	20 – 30	
©	Chemicals	40 – 50	
(d)	Fuel	10	10
		Total	100

The weightings shall be adjusted if, in the opinion of the Engineer, the weightings are rendered unreasonable, unbalanced, or inapplicable as the result of changes in the methods of performance of Operation and Maintenance of the plant and or for anyother reason.The decision of the Engineer shall be final and binding to the Contractor.

41. Liquidated damages

41.1 The Contractor shall pay liquidated damages to the Employer at the rate per day stated in the Contract Data for each day that the Completion Date is later than the Intended Completion Date (for the whole of the works or the milestone as stated in the Contract Data). The total amount of liquidated damages shall not exceed the amount defined in the Contract Data. The Employer may deduct liquidated damages from payments due to the Contractor. Payment of liquidated damages does not affect the Contractor's liabilities.

41.2 If the Intended Completion Date is extended after liquidated damages have been paid, the Employer shall correct any overpayment of liquidated damages by the Contractor by adjusting the next payment of bill.

42. DELETED

43. Securities:

43.1 The Security deposit (including additional security for unbalanced tenders) shall be provided to the Employer no later than the date specified in the Letter of Acceptance and shall be issued in an amount and form and type of instrument acceptable to the Employer. The Security deposit shall be valid until a date 30 days from the date of expiry of Defects Liability Period and the additional security for unbalanced tenders shall be valid until a date 30 days from the date of issue of the certificate of completion.

44. Cost of Repairs:

44.1 Loss or damage to the Works or Materials to be incorporated in the Works between the Start Date and the end of the Defects Correction periods shall be remedied by the Contractor at the Contractor's cost if the loss or damage arises from the Contractor's acts or omissions.

E. <u>Finishing the Contract</u>

45. Completion

45.1 The Contractor shall request the Employer to issue a Certificate of Completion of the Works and the Employer will do so upon deciding that the Work is completed.

46. Taking over

46.1 The Employer shall take over the Site and the Works within seven days of issuing a certificate of Completion.

47. Final account

47.1 The Contractor shall supply to the Employer a detailed account of the total amount that the Contractor considers payable under the Contract before the end of the Defects Liability Period. The Employer

shall issue a Defect Liability Certificate and certify any final payment that is due to the Contractor within 90 days of receiving the Contractor's account if it is correct and complete. If it is not, the Employer shall issue within 90 days a schedule that states the scope of the corrections or additions that are necessary. If the Final Account is still unsatisfactory after it has been resubmitted, the Employer shall decide on the amount payable to the Contractor and make payment within 60 days of receiving the Contractor's revised account.

48. As built drawings and /or Operating and Maintenance Manuals

48.1 If "as built"[1]Drawings and/or operating and maintenance manuals are required, the Contractor shall supply them by the dates stated in the Contract Data.

48.2 If the Contractor does not supply the Drawings by the dates stated in the Contract Data, or they do not receive the Employer's approval, the Employer shall withhold the amount stated in the Contract Data from payments due to the Contractor.

49. Termination

49.1 The Employer may terminate the Contract if the other party causes a fundamental breach of the Contract.

49.2 Fundamental breaches of Contract include, but shall not be limited to the following:

(a) the Contractor stops work for 45 days when no stoppage of work is shown on the current Program and the stoppage has not been authorized by the Employer;

(b) the Employer instructs the Contractor to delay the progress of works and the instruction is not withdrawn within 60 days;

[1]Completion Drawings

(c) The Contractor becomes bankrupt or goes into liquidation other than for a reconstruction or amalgamation;

(d) a payment due to the Contractor is not paid by the Employer within 90 days of the date of the submission of the bill by the Contractor.

(e) the Employer gives Notice that failure to correct a particular Defect is a fundamental breach of Contract and the Contractor fails to correct it within a reasonable period of time determined by the Employer;

(f) the Contractor does not maintain a security which is required;

(g) the Contractor has delayed the completion of works by the number of days for which the maximum amount of liquidated damages can be paid as defined in the Contract data; and

(h) if the Contractor, in the judgment of the Employer has engaged in corrupt or fraudulent practices in competing for or in the executing the Contract. For the purpose of this paragraph : "corrupt practice" means the offering, giving, receiving or soliciting of any thing of value to influence the action of a public official in the procurement process or in contract execution. "Fraudulent practice" means a misrepresentation of facts in order to influence a procurement process or the execution of a contract to the detriment of the Borrower, and includes collusive practice among Tenderers (prior to or after Tender submission) designed to establish Tender prices at artificial non-competitive levels and to deprive the Borrower of the benefits of free and open competition."

49.3 When either party to the Contract gives notice of a breach of contract to the Employer for a cause other than those listed under Sub Clause 49.2 above, the Employer shall decide whether the breach is fundamental or not.

49.4 Notwithstanding the above, the Employer may terminate the Contract for convenience.

49.5 If the Contract is terminated the Contractor shall stop work immediately, make the Site safe and secure and leave the Site as soon as reasonably possible.

50. Payment upon Termination

50.1 If the Contract is terminated because of a fundamental breach of Contract by the Contractor, the Employer shall prepare bill for the value of the work done less advance payments received up to the date of the bill, less other recoveries due in terms of the contract, less taxes due to be deducted at source as per applicable law and less the percentage to apply to the work not completed as indicated in the Contract Data. Additional Liquidated Damages shall not apply. If the total amount due to the Employer exceeds any payment due to the Contractor the difference shall be a debt payable to the Employer.

50.2 If the Contract is terminated at the Employer's convenience or because of a fundamental breach of Contract by the Employer, the Employer shall prepare bill for the value of the work done, the reasonable cost of removal of Equipment, repatriation of the Contractor's personnel employed solely on the Works, and the Contractor's costs of protecting and securing the Works and less advance payments received up to the date of the certificate, less other recoveries due in terms of the contract, and less taxes due to be deducted at source as per applicable law and make payment accordingly.

51. Property

51.1 All materials on the Site, Plant, Equipment, Temporary Works and Works are deemed to be the property of the Employer, if the Contract is terminated because of a Contractor’s default.

52. Release from performance

52.1 If the Contract is frustrated by any event entirely outside the control of either the Employer or the Contractor the Employer shall certify that the Contract has been frustrated. The Contractor shall make the Site safe and stop work as quickly as possible after receiving this certificate and shall be paid for all work carried out before receiving it and for any work carried out afterwards to which commitment was made.

F. <u>Special Conditions of Contract</u>

1. Labour :

The Contractor shall, unless otherwise provided in the Contract, make his own arrangements for the engagement of all staff and labour, local or other, and for their payment, housing, feeding and transport.

The Contractor shall, if required by the Employer, deliver to the Employer a return in detail, in such form and at such intervals as the Employer may prescribe, showing the staff and the numbers of the several classes of labour from time to time employed by the Contractor on the Site and such other information as the Employer may require.

2. Compliance with labour regulations:

During continuance of the contract, the Contractor and his sub contractors shall abide at all times by all existing labour enactments and rules made there under, regulations, notifications and bye laws of the State or Central Government or local authority and any other labour law (including rules), regulations, bye laws that may be passed or notification that may be issued under any labour law in future either by the State or the Central Government or the local authority. The Contractor shall keep the Employer indemnified in case any

action is taken against the Employer by the competent authority on account of contravention of any of the provisions of any Act or rules made there under, regulations or notifications including amendments. If the Employer is caused to pay or reimburse, such amounts as may be necessary to cause or observe, or for non-observance of the provisions stipulated in the notifications/bye laws/Acts/Rules/regulations including amendments, if any, on the part of the Contractor, Employer shall have the right to deduct any money due to the Contractor including his amount of security deposit. The Employer shall also have right to recover from the Contractor any sum required or estimated to be required for making good the loss or damage suffered by the Employer.

The employees of the Contractor and the Sub-Contractor in no case shall be treated as the employees of the Employer at any point of time.

3. Protection of Environment:

- The contractor shall ensure the plant operates within prescribed environmental norms, including:
  - Effluent discharge limits as per NGT/KSPCB/CPCB.
  - Odour control.
  - Proper handling and disposal of sludge.

The contractor shall take all reasonable steps to protect the environment on and off the Site andto avoid damage or nuisance to persons or to property of the public or others resulting from pollution, improper disposal of debris/Screened materials/Silt/Grit, noise or other causes arising as a consequence of his methods of operation. The contractor shall ensure that labor activities do not lead to environmental violations/Labourlaw . During continuance of the contract, the contractor and his sub-contractors shall abide at all

times by all existing enactments on environmental protection and rules made there under, regulations, notifications and bye-laws of the State or Central Government, or local authorities and any other law, bye-law, regulations that may be passed or notification that may be issued in this respect in future by the State or Central Government or the local authority.

4. Arbitration (Clause 24)

4.1 The procedure for arbitration shall be as follows:

(a) In case of dispute or difference arising between the Employer and the Contractor relating to any matter arising out of or connected with this agreement it shall be settled in accordance with the Arbitration and Conciliation Act 1996. The disputes or differences shall be referred to a Sole Arbitrator. The Sole Arbitrator shall be appointed by agreement between the parties; failing such agreement, by the Appointing Authority (any one of the Organizations as per list enclosed in Annexure)

(b) Arbitration proceedings shall be held at ***Bangalore***, Karnataka, India

(c) The cost and expenses of arbitration proceedings will be paid as determined by the Arbitrator. However the expenses incurred by each party in connection with the preparation, presentation, etc., shall be borne by each party itself.

(d) Performance under the contract shall continue during the arbitration proceedings and payments due the Contractor by the Employer shall not be withheld, unless they are the subject matter of the arbitration proceedings.

5 Contractor to Co-ordinate his Work with Other Contractors

5.1 The Contractor has to co-ordinate with the other concerned Contractors as already specified in Conditions of Contract for all such works as per the directions of Engineer in charge at no extra cost.

6 **Continuation of Work:**

6.1 In case of the death of a contractor after executing the agreement / commencement of the work, his legal heir, if any eligible registered contractor and willing, can execute and complete the work at the accepted tender rates irrespective of the cost of the work

SECTION 6:
CONTRACT DATA

Items marked "N/A" do not apply in this Contract.

The following documents are also part of the Contract:

- The Schedule of Operating and Maintenance Manuals
- The Methodology and Program of Construction
- Site Investigation Reports
- The Schedule of Key and Critical Equipment to be deployed on the work as per agreed program of construction.

The Employer is :

Name: Bangalore Water Supply and Sewerage Board represented by **Chief Engineer (Waste Water Management-E)**

Address: Bangalore Water Supply & Sewerage Board

5th Floor, Cauvery Bhavan D-Block,
K.G. Road, Bangalore 560009

Name of authorized Representative: Executive Engineer (WWM-STP)K&T Valley
Bangalore Water Supply & Sewerage Board
Marathalli ORR,Kadubeesanahalli Bangalore

Name of the work: **Work of Comprehensive Operation and Maintenance of**
6 MLD STP ar Kadugodi for the period of Four Years.

The start date shall be the date of issue of notice to proceed with the work.

The Intended Completion Date for the whole of the Works is **4 Years**

The Site possession date is the day of issue of notice to proceed with the work

The Site location is defined in drawing.

Insurance requirements are as under:

Type of Cover		Minimum Cover for Insurance
(i)	Works , Plant and materials	The sum stated in the Agreement plus 20%
(ii)	Loss or damage to equipment	Full replacement cost
(iii)	Loss or damage to property of Third Party	Full replacement cost
(iv)	Personal injury or death insurance (a) for Third Party	Rs.20 lakhs to cover 4 persons @ Rs.5 lakhs each
	(b) for Contractor's employees or labour	In accordance with the statutory requirements applicable to

		Karnataka

Price Adjustment Formula; [40]

The, amount payable to the Contractor and valued at base prices in accordance
with the payment Schedule shall be adjusted for rises or falls in the cost of Labor, Chemicals,
(Fuels\and other inputs to the Operation and Maintenance of plant by the addition ordeduction of the amounts determined by the formulae prescribed in this Sub-Clause. To the extent that full compensation for any risé or fall in costs to the Contractor during Operation and Maintenance is not covered by the provisions of this or any other clause in the Contract, the O & M Contract Price shall be determined to include amounts to cover the contingency of such other rise or fall in costs.

Adjustment Formula: The amount to be added to or deducted from 'the
Interim Payment Certificates for changes in cost and legislation shall be determined from the
formulae. The formulae will be of the following general type:
Pn=at+bLn+cCn+dFntete
Lo Co Fo
Where:
"Pn" is the adjustment factor to be applied to the payment for Operation and
Maintenance of the Plant carried out in month "n";

"a" is a fixed coefficient, representing the non-adjustment portion;

"b", "c", "d", etc., are coefficients represénting the estimated proportion of each cost
element (labor (L), Chemicals (C), Fuels and lubricants (F), etc.) in the Operation and

maintenance of the plant , as specified below;

“Ln”, “Cn”, “Fn”, etc., are the current cost indices or reference prices for month “n” to
‘ which the particular Interim Payment Certificate is related;

“Lo”, “Co”, “Fo”, etc., are the base cost indices or reference prices corresponding to the
above cost elements, on the Base Date as defined in the Section 2: Part 1 General Conditions.
The source of indices shall be those listed in Appendix to Tender..

Weighting and Adjustment Factors: The weightings (coefficients) for each of the factors of cost, shall be those listed in Appendix to Tender.:

The following events shall also be fundamental breach of the contract: [49.2]

1. The contractor has contravened Sub-clause 7.1 and Clause 9 of CC.

The percentage to apply to the value of the work not completed representing the Employer's additional cost for completing the Works shall be sufficient to get the balance of works completed by alternative agency. [50.1]

Sd/-

Chief Engineer
(Waste Water Management-E)

SECTION 7: SPECIFICATIONS

GENERAL STIPULATIONS AND CONDITIONS

1. DEFINTIONS

In this contract the following words shall be understood as having the meanings herein assigned to them.

a) "The Board" means the Bangalore Water Supply And Sewerage Board a statutory body constituted under Bangalore Water Supply And Sewerage Board Act 1964 having its office at Cauvery Bhavan, K. G. Road, Bangalore 560 009 and any officer duly authorized by this Board to act on its behalf.

b) "Operator" means the person or persons or firm or company contracting for the work specified including his or their executors or administrators or legal representatives or successors.

c) "Owner's Representative" means Chief Engineer or any other Owner's Representative appointed from time to time by the Board to act as such in connection with these works. Whenever and work is specified to be done or material supplied to the satisfaction of the Owner's Representative it shall be taken as including his properly authorized assistants and duly authorized representatives.

d) Works" means Work of Comprehensive Operation and Maintenance of 6 MLD STP
at Kadugodi for the period of Four Years.

e) "Contract" means these conditions of the contract, the Tender, the Operator's proposal, the Letter of Acceptance, the contract Agreement, O&M manual.

f) "Tender" means the Operator's priced offer to the Owner for the Operation and Maintenance of the treatment plant.

g) “Operator’s Proposal” means the Operator’s proposals and methodology for the operation and maintenance of the treatment plant.

h) “Letter of Acceptance” means the formal acceptance of the tender by the owner.

i) “Contract Agreement” means the contract agreement in the form agreed between the parties to record the contract. The cost of stamp charges and similar charges imposed by law shall be borne by the Operator.

j) Persons

   i) “Owner” means the person named in Sub Clause 3 and the legal successors in title such person, but not any assignee of such person.

   ii) “Operator” means the person whose Tender has been accepted by the owner and the legal successors in title to such person, but not any assignee of such person.

   iii) “Owner Representative” means the person appointed by the Owner to act as Owner’s representative for the purposes of the contract as named in sub clause 4, or other person appointed from time to time by the Owner and notified as such to the operator.

   iv) “Operator Representative” means the person appointed from time to time by the Operator.

k) Dates, Times and Periods

   i) “Effective Date” means the date on which the contract entered into legal force and effect.

   ii) “Commencement Date” means the date on which the Operator receives the notice to commence issued by the Owner's Representative.

   iii) “Contract Period” means the period from the commencement date to the date after 5 years.

iv) “Month” means a calendar month and “Year” means 365 days.

l) “Monthly Lump Sum Rate” means the rate stated in the Letter of Acceptance payable to the Operator each month for the Operation and Maintenance of the treatment plant.

m) “Variation” means any alteration and/ or modification to the requirements of the contract which is instructed by the Owner’s Representative..

n) “Law” means the Law of Republic of India.

o) Priority of Documents

The documents forming the contract are to be taken as mutually explanatory of one another. If there is an ambiguity or discrepancy in the documents, the Owner’s Representative shall issue any necessary clarification to the Operator, and the priority of the documents shall be as follows.

1) Letter of Acceptance,
2) Conditions of Contract,
3) Tender,
4) Operator’s proposal.

p) Communications

Whenever in the contract provision is made for the giving or issue of any notice, consent, approval, certification, instruction or determination by any person, unless otherwise specified such any notice. Consent, approval, certificate, instruction or determination shall be in writing or through log bookor through electronic mail and the words ‘notify’, ‘certify’, ‘instruct’ and ‘determine’ shall be constructed accordingly. Any such consent, approval, certificate or determination shall not unreasonably withheld or delayed.

2. COMMENCEMENT OF THE CONTRACT AND THE CONTRACT PERIOD

The O & M contract shall commence upon the written instruction of the Owner or the Owner's Representative. The Operator shall mobilize sufficient staff within 14 days to commence the Operation and Maintenance of the treatment plant. The Operator shall operate and maintain the treatment plant and pumping station for 5 years.

3. OWNER

4. The Executive Owner's Representative Executive Engineer (Wastewater Management) - 3 will manage day-to-day operation of the treatment plant. For the purpose of this contract, Chief Engineer (WWM) will be the Owner and EE (WWM-STP) K&T his sub ordinates AEE(WWM-STP) K&T - 1, will be the Owner's Representative.

5. THE OWNER'S REPRESENTATIVE

4.1 Owner's Representative's Duties and Authority

The Owner's Representative shall carry out the duties specified in the contract. The Owner's Representative shall have no authority to amend the contract or to relive the Operator of any of his duties, obligations and responsibilities under the contract. Any proposal, inspection, consent, approval or similar act by the Owner's Representative shall not relive the Operator of any of his responsibilities, including responsibility for his errors, omissions, discrepancies.

4.2 Owner's Representative's Authority to Delegate

The Owner's Representative may from time to time delegate any of his power to assistants AE, AEE and may at any time revoke such delegation. Any such delegation or revocation shall be in writing, specifying the powers, functions and authorities being delegated or

revoked, and shall not take effect until a copy has been delivered to the Owner and the Operator.

Any determination, instruction, inspection, examination, testing, consent, approval or similar act by any assistant of the Owner's Representative, in accordance with the delegation, shall have the same effect though it had been an act of the Owner's Representative. However, any failure to disapprove any procedures, inspections, testing etc., shall not prejudice the right of the Owner's Representative to reject such procedure, inspection, testing etc. If the Operator questions any determination or instruction of an assistant of the Owner's Representative, the Operator may refer the matter to the Owner's Representative, who shall confirm, reverse or vary such determination or instruction.

4.3 Owner's Representative's Instruction

Unless it is legally or physically impossible, the Operator shall comply with instructions given by the Owner's Representative in accordance with the contract. In particular, the Operator shall follow the Owner's Representative's instructions on BWSSB's requirements regarding the output of the treatment plant, the disposal of screenings, the disposal of sludge etc.,

4.4 Liaison with the Owner's Representative

The Operator will liaise with the Owner's Representative on all issues affecting the Operation and Maintenance of the treatment plant and shall submit daily records and monthly reports both in hard and soft copies (including SCADA reports) to him, with copies to the Owner.

From time to time, the Operator will attend meetings with the Owner and the Owner's Representative to review the Operation and Maintenance of the treatment plant.

The Owner or the Owner’s Representative or any of the Owner’s Representative’s authorized assistants shall have the right of access to inspect any part of the treatment plant at any time, including access to the Operator’s records. The Operator shall provide all necessary facilities to enable such inspection.

4.5 Owner’s Representative to attempt Agreement

When the Owner’s Representative is required to determine value, cost etc., he shall consult with the Operator in an endeavor to reach agreement. If agreement is not reached, the Owner’s Representative shall determine the matter fairly, reasonably and in accordance with the contract.

6. THE OPERATOR

5.1 The Operator will be responsible for the daily operation of the treatment plant 24 hours per day in three shifts of 8 hours each to treat the wastewater flowing into the treatment plant. The Operator shall optimize the operation of the treatment plant in most effective manner in terms of the consumption of power, spares and consumables.

5.2 The Operator shall be totally responsible for the maintenance of the treatment plant to ensure the reliability of the process operations as well as the longevity of the plant and structures, comprising the treatment plant, so that these items are handed back to the Owner in good working condition, except for fair wear and tear.

5.3 The Operator shall provide all superintendence, labor, materials, and consumables, under take all minor and major repair required for the operation and maintenance of the treatment plant.

5.4 The Operator shall not sublet or assign any part of the contract without the written permission of the Owner. The man power required for the day to day operation may be taken on contract basis from any

agency who are capable of providing the same except for the Plant Manager/ Process Engineer, and Plant Chemist. If man power is on contract basis, the Operator is solely responsible for the day to day Operation and Maintenance of the plant. Hired agency will not be held responsible for the O & M.

The statutory requirements such as PF, ESI shall be paid to the concerned either by the Operator or the hired agency. The operator shall indemnify the Board from any legal action against the nonpayment of statutory requirements. In case the hired agency is paying the statutory requirements, then the Operator shall make sure that the payments are made to the concerned departments within the due date. The monthly bills will be admitted only after the receipts for having made the required payments are submitted and enclosed to the bills. The operator is also responsible for the welfare of the laborers engaged in the O & M of the plant.

5.5 Quality Assurance

The Operator shall institute a quality assurance system to demonstrate compliance with the requirements of the contract. Compliance with the quality assurance system shall not relieve the Operator of his obligations, duties and responsibilities under this contract. Details of all procedures and compliance documents shall be submitted to the Owner’s Representative for his information. Signed quality assurance statements for such reports shall accompany the Operator’s monthly reports to the Owner’s Representative. The Owner’s Representative shall be entitled to audit any aspect of the system and require any remedial action to be taken.

5.6 Matters affecting the Operation and Maintenance of the treatment plant

The Operator shall be deemed to have taken account of the conditions, which may prevail, and of facilities available to him, when he takes possession of the treatment plant from the Owner and all risks, contingencies and other circumstances, which may affect or influence his contract price. The Operator shall be deemed to have satisfied himself as to the correctness and sufficiency of his prices, which shall cover all his obligations under this contract. The Operator shall provide at his own cost any tools, tackles and equipment, replacement parts etc., necessary for the satisfactory operation and maintenance of the treatment plant.

5.7 Inception Report

The Operator shall submit to the Owner's Representative within 28 days of the commencement of the contract a detailed description of the arrangements and methods, which the Operator proposes to adopt for the execution of the contract showing how he will operate and maintain the treatment plant. This inception report shall be in amplification of the Operator's Tender proposal and Operator shall not reduce the scope of the services offered therein. The report shall cover the following.

i) Staffing – Staff and labour organization (including organization chart), staff and skilled labour qualifications, experience certificates, medical fitness certificates ,schedules of responsibilities, training programs, administration and monitoring.
ii) Operations – Operations management and planning, operating instructions and procedure manuals, receiving and monitoring consumables, laboratory testing and quality monitoring, procedures for emergency conditions such as fire etc. safety training schedules, medical testing schedule etc,

iii) Maintenance – Maintenance planning, maintenance management, work control including preventive and corrective maintenance and outage planning.
iv) Compliance – efficiency and performance monitoring, performance testing, quality control etc.,

No significant alteration shall be made to such arrangements and methods without the approval of the Owner’s Representative.

5.8 Monthly Reports

The Operator shall prepare and submit monthly reports to the Owner’s Representative for the works included in this tender, in four copies bothhard and soft copies (Including SCADA reports) and within 5 days of the next month. The report shall describe the operation and maintenance of the treatment plant with copies of the records submitted to the Owner’s Representative including the summaries of the record in tabular and graphical form. The report shall include a section describing the performance in terms of compliance with the requirement of the contract. The Operator shall make available all supporting documents, records etc., to the Owner’s Representative if required to do so.

The report shall be in a form approved by the Owner’s Representative to cover

i) Operation – Records of inflow and outflow.
ii) Maintenance – A list of plant break down, spares consumed, minor and major repairs carried out, schedule of maintenance carried out during the month etc.,

iii) Staff, Skilled labor and unskilled labor – number of staff utilized, training program conducted if any, performance evaluation made if any etc.,

iv) Safety – Brief reports of all accidents and hazardous incidents including description of cause, extent of damage, action taken and precautions taken to prevent the repetition.

v) Inspection reports of Routine / daily / weekly / monthly/ quarterly/ half yearly/ yearly.

vi) Medical check up reports of Staff, Skilled labor and unskilled labor .

vii) Any other relevant information connected with the Operation and maintenance of treatment plant.

viii) Guaranteed power consumption report as per contract.

ix) Monthly BESCOM bill.

x) Quality assurance certificate.

xi) ESI/PF receipts paid to O&M staff.

xii) Third party testing reports of raw water, treated water and sludge sample.

xiii) Treated water supply details through BWSSB JALA Snehi app/ through pumping /tanker.

xiv) Sludge disposal details.

xv) Calibration reports for energy meters, flow and level meters.

xvi) OCEMS reports.

xvii) KSPCB monthly testing reports.Etc

xviii) The list of above documents is only limited but the operator has to submit all the necessary documents as per the instructions of BWSSB whenever required both in soft/scanned and hard copies as per the instructions of BWSSB .

6. SCOPE OF THE CONTRACT

This contract comprises Comprehensive Operation and Maintenance of 6MLD UWTP at Kadugodi for a period of 4 years including minor and major repairs to all the equipment inside the UWTP premises. Daily operation of equipment and machinery, Monitoring of plant performance parameters, Sludge disposal, Routine and preventive maintenance, Emergency response and troubleshooting Cleaning and upkeep of the UWTP premises.Supply of all spares required for the operation of the plant, supply of oil and lubricants, supply of supervisory and security staff, maintenance of gardens and trees and except power charges inclusive of all incidental items of work round the clock for a period of four years. or mentioned in these specifications and in the schedule hereto, annexed. The specifications, schedules etc., are to be considered as explanatory of each other and no advantage shall be taken of any omission in any of these documents. Even though the quantity of wastewater to be increased/ decreased at any point of time as directed by the Owner’s Representative.

7. OBLIGATIONS OF THE BOARD

a) Cost of BESCOM power will be paid directly to BESCOM.
b) Ensuring that all equipment and tanks are in good working condition before handing over the Plant. This could be decided by a joint inspection.
c) To conduct surprise checks. For this purpose Board may nominate any of its officers for inspection without prior notices.
d) Payments will be made on receipt of bills along with all the supporting documents including monthly reports and any other documents required as per the instructions of BWSSB from the Operator once in a month.

8. DISCREPANCIES AND OMISSIONS

a) Should any discrepancy appear in any of the documents included in the contract or between different parts of the same documents or ambiguity or insufficiency of information; the Operator shall point out the same to the Owner's Representative in writing and receive his instructions, explanation or decision in the matter, before beginning the work in question.

b) In the event of anything reasonably necessary or proper to the due and complete performance of the work (of which the Owner's Representative shall be sole judge) being omitted to be shown or described in the specification and schedules the Operator shall notwithstanding execute and provide at the rates noted in the bills all such omitted works and things as if they had been severally shown and described and according to the directions of the Owner's Representative and to his satisfaction.

9. SCHEDULE (BILL OF QUANTITIES)

The Operator shall not be held responsible for the accuracy of the schedules hereto attached but only for the accuracy of the prices, amounts and totals therein appearing. The rate for each item of the work in the schedule shall be inclusive of the costs and charges of all material, labor, tools and plant necessary for the full and complete execution of the work as described in the specification and schedule unless otherwise specified and for the due fulfillment of all the requirements relating thereto as specified in the contract. If any error, omission or misstatement shall be discovered in the said quantities the same shall not vitiate the contract for release the Operator from execution and completion of the whole or any part of the said works or

form any obligations or liabilities of the Operator under this contract or entitled the Operator to any damages or compensation from the Board.

10. PREPARATION OF CERTIFICATES

In preparing the interim or final certificates of payment to the Operator, the Owner’s Representative shall take into account the total included in this contract as set out in the priced bills and should it appear after measurement that these works have been exceeded, he shall certify for the amount so executed in excess at several appropriate prices or rates in the said bills.

11. CONTRACT GENERAL EXPLANATION

The works under this contract and every addition, alteration or deviation directed to be executed under this contract or that may be necessary or proper to be done in order to perfect and complete the same, shall be executed by the Operator in the best and most substantial and workman like manner, with materials, of the best and approved quality of their respective kinds, according to particulars contained in or implied by the specifications and schedules hereto attached or such other additional particulars explanations as may be given or approved by the Owner’s Representative and to full and entire satisfaction of the Owner’s Representative, according to the instructions and directions from time to time given by the Owner’s Representative. The Owner’s Representative shall have full liberty from time to time and at all times to inspect, examine and test the materials and workmanship and may at any time reject any or all of the materials or workmanship which may seem defective or unfit or improper for the several purposes they are applied or not in accordance with the said bills, specifications, instructions or directions.

12. OPERATOR’S LIABILITY

The Operator shall be absolutely and solely responsible for any and all kinds of injuries or damages to person and property of any description whatever may be caused by or result from the execution of the works, whether these may have been carried out skill fully and carefully and strictly in conformity with the provisions of the specifications or not.

13. OPERATOR TO BE RESPONSIBLE FOR ALL TREAPASSES AND DAMAGES

The operator of a Used Water Treatment Plant (UWTP) being held responsible for trespasses and damages implies that the operator is liable for:

1. Trespasses:
    - Unauthorized access to private or restricted property during the course of operation or maintenance of the UWTP.
    - Violations related to encroachment or illegal use of land or premises.
2. Damages:
    - Any harm caused to property, infrastructure, or the environment as a result of the operator's actions or negligence.
    - Injuries or accidents caused to individuals due to improper operation or maintenance of the plant.

In the event of accident to any person including employees of the Board on duty, trespass on land, injury to cattle, horses or other animals or damage injury of any description to any person or thing arising out of the execution of the works, the Operator shall be held responsible for

and make good the same and shall indemnify the Board from all claims or expenses on account thereof and if the Board has to pay any money in respect thereof the sum so paid and the costs incurred by the Board shall be charged to the Operator as so money paid to him on account of his contract and the Operator shall not be at liberty to dispute or question the right of the Board to make such payment for him or on his account notwithstanding the same may have been made without his consent of authority and decision determination in law or otherwise to the contrary notwithstanding. The Board shall not be liable to, or for in respect of any damages or compensation or claim therefore, under any Act for the time being in force or common law because or by reason or in consequences of any accident or injuries to workman or others in the employment of the Operator or any sub Operator or any person acting under him or on his behalf or the staff/ persons employed by the Board for supervision of the work under his contract and the Operator shall save the Board harmless and indemnify in respect thereof and of any and all costs and expenses incident thereto or consequent thereon.

14. OPERATOR'S SUPERVISION OF WORK

The **Operator's Supervision of Work** in an STP (Sewage Treatment Plant) ensures that all activities related to operation, maintenance, and management are performed safely, efficiently, and in compliance with regulatory and contractual requirements. Below are the key aspects of supervision that the operator should undertake:

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1. General Supervision Duties

- **Daily Monitoring**: Oversee all plant activities, including wastewater treatment processes, sludge handling, and equipment operation.
- **Workforce Management**: Supervise plant personnel, contractors, and any third-party service providers to ensure tasks are carried out effectively.
- **Schedule Management**: Plan and manage work schedules, ensuring routine maintenance and repairs are completed without delays.
- **Compliance Oversight**: Ensure that all operations adhere to environmental laws, safety standards, and local regulations.

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2. Maintenance Supervision

- **Preventive Maintenance**: Oversee routine inspections, lubrication, and calibration of equipment to prevent breakdowns.
- **Corrective Maintenance**: Supervise repair work promptly in case of equipment failure or system issues.
- **Spare Parts Inventory**: Ensure an adequate stock of critical spare parts to minimize downtime.

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3. Health, Safety, and Environmental (HSE) Supervision

- **Safety Protocols**: Enforce the use of personal protective equipment (PPE) and adherence to safety guidelines.

- **Hazard Identification**: Monitor potential hazards, such as chemical spills or electrical risks, and implement corrective actions.
- **Environmental Monitoring**: Supervise the discharge of treated water to ensure compliance with effluent quality standards.

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3. Reporting and Documentation

- **Hourly Logs**: Maintain logs of plant operations, including equipment performance, input parameters, and output quality.
- **Daily Logs**: Maintain logs of plant operations, including equipment performance, input parameters, and output quality.
- **Incident Reporting**: Document any operational anomalies, accidents, or near-misses and take corrective measures.
- **Regulatory Reporting**: Submit required reports to authorities, such as effluent analysis or compliance audits.

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5. Training and Skill Development

- **Team Training**: Ensure that plant personnel are well-trained in STP operations, safety protocols, and emergency procedures.
- **Skill Upgrades**: Identify skill gaps and arrange periodic training sessions to enhance workforce capabilities.

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6. Emergency Supervision

- **Crisis Management**: Lead the response to emergencies, such as equipment failures, overflows, or chemical spills.
- **Contingency Planning**: Ensure readiness of backup systems, such as generators or alternative treatment processes.

- **Coordination with Authorities**: Liaise with local authorities or emergency services during critical situations.

a) The Operator shall give or provide all necessary superintendence during execution of the works and as long thereafter as the Owner's Representative may consider necessary. Such superintendence shall be given by sufficient person having adequate knowledge of the operations to be carried out (including the methods and techniques required, the hazards likely to be encountered and methods of preventing accidents) as may be requisite for the satisfactory performance of the contract.
b) Details of key personnel to be employed by the Operator.

15. COMMENCEMENT OF WORK AND RATE OF PROGRESS

Below is a structured outline addressing the commencement and progress of work for the operation and maintenance of a Sewage Treatment Plant (UWTP):

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1. Commencement of Work

- **Start Date**:
  - The operator shall commence work on the agreed start date as specified in the contract or upon the issuance of a written work order.
  - Any delay in commencement must be formally communicated and approved by the client/owner.

- **Pre-Start Requirements**:

    - Conduct a joint inspection of the STP to document its initial condition and identify any pre-existing issues.
    - Submission and approval of the following documents:
        - **Operation Plan**: Detailed strategy for running the plant.
        - **Maintenance Schedule**: Comprehensive schedule for preventive and corrective maintenance activities.
        - **Staffing Plan**: List of personnel with their qualifications and roles.

- **Mobilization**:
    - Deploy necessary workforce, tools, equipment, and materials to the site before the commencement date.
    - Ensure operational readiness, including initial checks of all machinery, electrical systems, and safety equipment.

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2. Rate of Progress

- **Operational Efficiency**:
    - The plant must operate at the designed capacity or as specified by the contract to achieve the desired treatment standards.
    - Key performance indicators (KPIs) such as treated water quality, sludge management, and energy consumption must be met as per regulatory norms.

- **Maintenance Timelines**:
    - Preventive maintenance tasks shall be completed as per the approved schedule without causing unplanned downtime.

    - Emergency repairs must be undertaken within [agreed-upon timeframe, e.g., 24-48 hours], depending on the nature of the issue.

- **Reporting and Milestones**:
    - Weekly and monthly progress reports shall be submitted to the client/owner, detailing:
        - Operational parameters and compliance with effluent discharge standards.
        - Status of maintenance activities.
        - Any delays or issues encountered and actions taken to resolve them.
    - Annual audits or reviews shall be conducted to assess overall progress and performance.

- **Adjustment to Progress**:
    - The operator shall adjust the rate of work to address any delays, changes in operational requirements, or unforeseen challenges, ensuring compliance with deadlines and regulatory standards.

The Operator must commence, execute and complete with such expedition as the Owner’s Representative shall require and, in a manner, satisfactory to the Owner’s Representative all works for which he has accepted orders.

16. SKILLED WORKMEN TO BE EMPLOYED

The operation and maintenance of a Sewage Treatment Plant (STP) require skilled personnel to ensure efficient and safe functioning.

Below is a detailed outline of the key considerations regarding the employment of skilled workmen:

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1. Categories of Skilled Workmen

- **Plant Operator**:
  - Responsible for overseeing the entire operation of the STP, including managing the treatment process, monitoring equipment, and ensuring compliance with discharge standards.

Qualifications: Graduate/Post Graduate in Civil, Electrical, Electronics, Mechanical, Public Health, or Environmental Engineeringwith specialization inwastewater collectionand treatment and having experience in STP and Sewage PumpingStationsTesting,Commissioning, Operation & Maintenance, Liaison withGovernment,Pollution Control Authorities.

  - **Experience**: Minimum [5 years] in operating similar STPs.

- **Plant Supervisors**:
  - Assist Plant manager in overseeing the entire operation of the STP
  - **Qualifications**: Graduate in Civil / Environmental/ Mechanical/ electrical engineering.
  - **Experience**: Minimum [3- 4 years] in maintaining electrical systems.

- **Electrical Technician**:

- Handles electrical systems, including motors, panels, pumps, and other equipment, ensuring their proper functioning.
- **Qualifications**: ITI or equivalent certification in electrical engineering.
- **Experience**: Minimum [5 years] in maintaining electrical systems.

- **Mechanical Technician**:
  - Responsible for maintaining and repairing mechanical components such as pumps, blowers, valves, and aerators.
  - **Qualifications**: ITI or diploma in mechanical engineering.
  - **Experience**: Minimum [2–3 years] in mechanical maintenance.

- **Lab Technician**:
  - Conducts water quality tests to ensure compliance with effluent discharge standards and monitors influent and effluent parameters.
  - **Qualifications**: Bachelor’s degree/diploma in chemistry, microbiology, or environmental science.
  - **Experience**: Minimum [3-5 years] in laboratory testing.

- **Helpers/Assistants**:
  - Assist skilled technicians and operators in routine tasks such as cleaning, handling tools, and performing basic maintenance activities.
  - **Qualifications**: Basic education and some relevant experience preferred.

The Operator shall employ only competent and skilled persons to do the work. The Operator shall furnish a list of key personnel, skilled and semi-skilled personnel proposed to be employed by him for this plant with their name, educational qualification and experience in years at the time of signing the agreement. This list shall form part of the agreement. The Operator shall change any of the persons only with person of equal or higher qualification and experience after obtaining prior approval of the Owner's Representative.

Whenever the Owner's Representative has to inform him in writing that any person on the work is in his opinion unsatisfactory or incompetent or unfaithful or dishonest or untruthful or disorderly or otherwise unsuitable such person shall be discharged from the work and shall not be employed again on it.

17. ABSENCE OF THE OWNER'S REPRESENTATIVE

If and so often as it may happen that the Owner's Representative shall be absent from the works for any cause whatsoever the Owner's Representative shall act as the Owner's Representative during his absence or until the Board shall appoint some other person to act as such Owner's Representative and Owner's Representative or other person appointed as aforesaid as the case may be shall during the said absence of the Owner's Representative, have all the powers and duties relating to all the matters and things in connection with the works or any disputes and difference arising there from or in any way connected there with, as are conferred on the Owner's Representative by virtue of this contract.

18. MATERIALS, IMPLEMENTS AND LABOUR PROVIDED

Expect for such materials as are herein stated to be supplied by the Board, the Operator shall at his cost and charges furnish all materials and labour and everything necessary for the complete performance of this contract.

19. OWNER’S REPRESENTATIVE TO HAVE RIGHT TO INSPECT PLACES FROM WHERE MATERIALS ARE OBTAINED

The Owner’s Representative shall have the right to inspect and verify the sources of materials intended for use in the operation and maintenance of the Sewage Treatment Plant (STP). This includes, but is not limited to, quarries, factories, suppliers, or any other locations from where materials are procured.

The Contractor shall provide all necessary access, assistance, and information required for such inspections, including but not limited to:

Facilitating site visits by the Owner’s Representative or their authorized personnel.

Providing documentation, certifications, and test results confirming the quality and compliance of materials with the agreed specifications.

Ensuring that the materials sourced comply with all applicable local and statutory regulations.

The Owner’s Representative reserves the right to reject materials that do not conform to the required quality, specifications, or regulations. Any costs or delays arising from the use of such non-compliant materials shall be solely borne by the Contractor.

All places wherein any materials are being made or obtained for the works and the whole of the process connected therewith and all the other operations of the Operator or any authorized sub - Operator, manufacturer or tradesman shall be open to the inspection and control of the Owner's Representative and all persons authorized by him at all times. The Operator has to furnish the test report, Manufacturers recommendations for the materials used for the performance of the contract. The Owner's Representative in his discretion shall have the right for replacement of Operator's staff who is found to be unfit to discharge the duties.

20. **MATERIALS AND WORKMANSHIP INFERIOR WORK TO BE AMENDED** PROCEEDINGS ON REFUSAL

Here's a draft clause addressing Materials and Workmanship – Inferior Work to be Amended; Proceedings on Refusal for the operation and maintenance of an STP:

Materials and Workmanship – Inferior Work to be Amended; Proceedings on Refusal

1. Standards of Materials and Workmanship:
   All materials used and workmanship performed in the operation and maintenance of the Sewage Treatment Plant (STP) must strictly adhere to the specifications, standards, and quality requirements outlined in the contract.
2. Rectification of Inferior Work:
   If any materials or workmanship are found to be of inferior quality, defective, or not in compliance with the contractual

requirements, the Owner’s Representative shall notify the Contractor in writing. The Contractor shall promptly rectify or replace such materials or re-perform the work to the satisfaction of the Owner’s Representative, without any additional cost to the Owner.

3. Inspection and Approval:
   The rectified work or replacement materials shall be subject to inspection and approval by the Owner’s Representative. Any delays caused by the need for rectification shall not be grounds for an extension of time unless explicitly agreed upon in writing by the Owner.
4. Proceedings on Refusal:
   If the Contractor refuses or fails to amend defective work or replace substandard materials within a reasonable time as determined by the Owner’s Representative:
   - The Owner shall have the right to procure the required materials or services from an alternative source or arrange for the defective work to be corrected by a third party.
   - Any costs incurred by the Owner in such proceedings, including administrative expenses, shall be recoverable from the Contractor, either by deduction from payments due under the contract or as a debt owed by the Contractor.
5. No Waiver of Rights:
   Acceptance of any defective or substandard work by the Owner or failure to enforce rectification immediately shall not constitute a waiver of the Owner's right to require full compliance with the contract terms at any time during the contract period.

If any material brought upon to the site of works or to the places where any operations have been or being carried out in connection with or for the purposes of the works, be in the judgment of the Owner's Representative, of an inferior or improper description or improper to be used in the works, the said materials or workmanship shall where required by the said officer be removed or amended by the Operator forthwith or within such period or every breach by the Operator of this clause, the Owner's Representative is hereby authorized to remove or cause to be removed the materials and workmanship so objected to or any part thereof, and replace the same with such other materials and workmanship as shall be satisfactory to him and there upon the Operator shall on demand repay to the Board the expense incurred thereby or to which the Board may be put or be liable in connection therewith, the amount thereof to be certified by the Owner's Representative whose certificate shall be final.

21. OPERATOR NOT TO OCCUPY LAND ETC., AFTER NOTICE FROM THE OWNER'S REPRESENTATIVE

Occupancy Restrictions:
The Operator shall not occupy, use, or obstruct any land, premises, or facility beyond the agreed-upon areas specified for the operation and maintenance of the Sewage Treatment Plant (STP) without prior written approval from the Owner or the Owner's Representative.

Notice to Vacate:
Upon receiving written notice/through email from the Owner's Representative, the Operator shall vacate or cease using any designated land, premises, or facility within the timeframe specified in the notice.

Restoration of Site:
The Operator shall restore the vacated land, premises, or facility to the condition stipulated in the contract or as otherwise directed by the Owner’s Representative. Any costs associated with the restoration shall be borne by the Operator unless otherwise agreed in writing.

Non-Compliance:
If the Operator fails to vacate or restore the site as directed:

The Owner shall have the right to take necessary actions, including removing the Operator’s equipment, materials, or personnel from the site.

Any costs incurred by the Owner in enforcing this provision, including damages or restoration expenses, shall be recoverable from the Operator.

Liability for Extended Occupation:
Continued occupation or unauthorized use of land, premises, or facilities after notice shall render the Operator liable for any resulting losses, damages, or penalties incurred by the Owner.

No Impact on Operations:
The Operator shall ensure that the vacating or cessation of use does not compromise the ongoing operation and maintenance of the STP or cause disruption to its functioning.

In no case, shall the Operator continue to use or occupy or allow to be used or occupied any land or property either for the deposit of materials or plant or for any purpose whatever after written notice from the Owner’s Representative shall have been addressed to the

Operator at his usual or last known place of abode or business and sent through the post offices or other modes of delivery requiring the Operator to remove or cause to be removed all such materials or plant from any such land or property as aforesaid or to give up vacant possession of such land or property to the Owner’s Representative and should any such materials or plant remain upon any such land or property or shall any such land or property remain occupied or be used after such notice for any purpose whatsoever as aforesaid, then and in every such case and as often as the same shall happen the Operator shall forfeit and on demand pay to the Board the sum of Rs. 1000/- (One thousand only) per day as and for liquidated damages for each and every day during which the said lands or property are so used and occupied as aforesaid from the time such notice has been given.

22. RESPONSIBILITY FOR ACCIDENTS, DAMAGES ETC.,

Operator's Liability

The Operator shall be fully responsible for any accidents, damages, or liabilities arising during the operation and maintenance of the Sewage Treatment Plant (STP). This includes:

- Injury or harm to personnel, workers, or third parties.
- Damage to property, equipment, or surrounding infrastructure.
- Environmental damage, including pollution or non-compliance with statutory norms.

Compliance with Safety and Environmental Standards

The Operator shall:

- Follow all applicable safety protocols and environmental regulations to prevent accidents.

- Ensure that all discharges and operations comply with legal and regulatory requirements.

Indemnity
The Operator shall indemnify and hold the Employer/Owner harmless from any claims, losses, damages, or penalties arising due to negligence, improper maintenance, or operational lapses.

Insurance Obligations
The Operator shall maintain sufficient insurance coverage to address:

- Worker injuries or fatalities.
- Third-party liabilities for accidents or damages.
- Damage to the STP and related infrastructure.

Reporting and Remediation
In the event of an accident or damage:

- The Operator must immediately notify the Employer/Owner and take necessary actions to mitigate further risks.
- All damages caused due to the Operator's negligence must be repaired or compensated at their own cost.

Breach of Responsibility
Failure to uphold these responsibilities may result in penalties, claims, or termination of the contract, with all associated costs borne by the Operator.

The care of the whole of the permanent works shall remain with the Operator who shall be responsible for all accidents or damages from whatever cause arising and chargeable for anything that may be stolen,

removed, destroyed, damaged to whomsoever belonging and also for making good all defects and damages to the said works or to any property adjoining or any cause whatever, whether such damage or defects were occasioned by the negligence of the Operator or not or may be or might have been discovered during the progress to be known after the completion whereof or whether payment may wholly or partially have been made or the works approved as supposed to have been properly done and no certificate of approval of any works by any officers or members of the Board shall affect or prejudice the right of the Board against the Operator or be considered or held as at all conclusive as to the sufficiency of any works or materials.

23. SUSPENSION OF PROGRESS

Authority to Suspend

The Employer/Owner reserves the right to order the Operator to suspend, in whole or in part, the operation and maintenance activities of the Sewage Treatment Plant (STP) for any of the following reasons:

- Non-compliance with the terms of the contract.
- Safety concerns or risk of harm to personnel, property, or the environment.
- Regulatory violations or directives from government authorities.
- Operational deficiencies, including failure to meet performance standards.
- Force majeure events as defined in the contract.

Notice of Suspension

a. The Employer/Owner shall issue a written notice specifying the reasons for suspension and the scope of activities to be halted.

b. The Operator must immediately comply with the suspension order

and take necessary measures to ensure the safety and preservation of the STP and its assets during the suspension period.

Operator’s Obligations During Suspension

- The Operator shall maintain essential operations as required to prevent damage, environmental harm, or degradation of the STP.
- All personnel, equipment, and resources should remain in a state of readiness to resume operations promptly when instructed.
- The Operator shall address the issues that led to the suspension and implement corrective actions to the satisfaction of the Employer/Owner.

Resumption of Work

- The Employer/Owner shall issue a written notice for the resumption of activities once the reasons for suspension have been resolved.
- The Operator must resume all suspended activities immediately upon receiving such notice.

The Operator shall without recompense claim or demand, delay or suspend the progress of the works or any part thereof, if and when and so often as required by the Owner’s Representative and for such times as may in the judgment of the Owner’s Representative be necessary for the purposes or advantages of the undertaking and shall whenever directed by the Owner’s Representative and upon all needful occasions whether directed by the Owner’s Representative and upon all needful occasions whether directed or not at the Operator’s expense properly cover down and secure so much of the works as may be liable to sustain damage from weather or any other cause and shall at all times

and forthwith when required properly make good to the satisfaction of the Owner's Representative all damages or injury which such works or any part thereof may have sustained.

24. RECOVERY ETC., OF MONEY PAYABLE TO BWSSB

General Provisions

Any money payable by the Operator to the Owner under the terms of this contract, including but not limited to penalties, damages, compensation, or other charges, may be recovered by the Owner through the methods outlined in this clause.

Modes of Recovery

The Owner may recover the amounts due through any of the following methods:

a. **Deduction from Payments**

- The Owner may deduct the payable amount from any bills, invoices, or payments due to the Operator under this contract or any other contracts with the Owner.

b. **Retention from Performance Security**

- The Owner may recover the amount by encashing or appropriating the Performance Security submitted by the Operator.

c. **Direct Payment Demand**

- The Owner may issue a written demand for payment, requiring the Operator to pay the amount directly within a specified period.

d. **Legal Remedies**

- If the Operator fails to pay the amount due within the stipulated time, the Owner may initiate legal proceedings to recover the amount, including interest and associated legal costs.

Interest on Outstanding Amounts

Any amount payable by the Operator that remains unpaid beyond the due date shall attract interest at a rate of ___% per annum, calculated from the due date until the date of actual payment.

Penalties and Fines

If the recovery is due to non-compliance, breach of contract, or failure to meet performance standards, additional penalties as specified in the contract may also be applied.

Notification of Recovery

a. The Owner shall provide the Operator with a written notice specifying:

- The nature and amount of the claim.
- The reason for recovery.
- The method and timeline for recovery.

b. The Operator shall have the opportunity to present any objections or clarifications within a stipulated period before the recovery is finalized.

Adjustment in Subsequent Payments

If the recovery amount exceeds the payments currently due to the Operator, the balance may be adjusted against future payments until the entire amount is recovered.

Final Settlement

Any recovery not addressed during the contract period shall be settled during the final closure of the contract. The Owner may withhold final payments until all dues are cleared.

Operator’s Liability

The Operator shall remain fully liable for the payment of all

recoverable amounts, irrespective of any disputes or claims, unless resolved through mutual agreement or arbitration.

Arbitration for Disputes

In case of disputes regarding the recovery amount or method, the matter shall be resolved through the dispute resolution or arbitration mechanism specified in the contract.

All losses, costs, damages and expenses and other money payable to the Board by the Operator under any stipulation in this contract, may be retained out of any money then due or which may subsequently become due from the Board to the Operator under this or any other contract or otherwise howsoever and in case such money then due or to become due to the Operator by the Board shall be insufficient to pay such losses, costs, damages and other money payable to the Board by the Operator it shall be lawful for the Board without any further consent on the part of the Operator to sell and dispose of any or all of the Government promissory notes or securities deposited with the Board by the Operator as aforesaid and with and out of the proceeds of such sale, after payment of all expenses connected therewith or reimburse and pay to the Board all such losses, costs, damages and expenses and other money payable to the Board by Operator and in case such proceeds of sale of the said Government promissory notes or securities shall be insufficient for such purpose then and in that case, shall be lawful for the Board to recover the residual thereof and if necessary legal proceedings would be initiated against the Operator.

The operator responsibility

1. The operator has to liaison with KSPCB to obtain KSPCB CFO/CFE or renewal of CFO and should get monthly analysis reports from M/s KSPCB which should be maintained and made available to the inspecting officer of the Board Should be shared to the employer in hard copy/soft copy/scanned copy after duly signed by the operator and engineer in charge. If parameters breach in the report of M/s KSPCB the operator has to submit the compliance report accordingly.

2. The operator has to ensure that inflow and outflow flow meter data and online continuous effluent monitoring system data are transmitted to BWSSB Central SCADA at Shimsha Bhavan and KSPCB CPCB Server and the operator should maintain average daily OCEMS data at site and made available to the inspecting officer of the Board and Should share to the employer in hard copy/soft copy/scanned copy after duly signed by the operator and engineer in charge.

3. The operator has to do recharge of SIMs present in the modems to transmit data to Central Scada, KSPCB/CPCB Server.

4. The operator has to test the outlet water, inlet water and sludge sample fortnightly at NAHL accredited laboratory records should be maintained and made available to the inspecting officer of the Board and Should be shared with the employer in hard copy, soft copyand scanned copy after duly signed by the operator and engineer in charge. If parameters are breached in the report of NABI, an accredited laboratory the operator has accordingly submit the compliance report

5. The operator should share the plant's daily activities like the flow meter GPS picture video, O&M staff pictures/videos shift-wise, and GPS pictures/Videos of Major and Minor repairs carried out at the plant, consumables consumed in the plant etc as per instructions of the board engineer in charge

6. The operator has to liaison with the electrical inspector and operator has to bear the electrical inspectorate inspection fee and should attend to submit the compliance report to the observations made by the electrical inspector from the Class I electrical contractor.
7. The operator has to ensure that the office stationary in administrative office at site made available to BWSSB’s engineer in-charge. The office stationary include Desktop,Laptop,colour Printer both A4 and A3 ,Wifi connection, A4/A3 size sheets etc.
8. Plant manger should have laptop to update hourly flow details and other data as per the instructions of BWSSB’s plant engineerin charge.
9. The operator has to ensure that office in the admin building is having good Wi-Fi connection ,Desktops,printers and papers etc.
10. The cost of electrical energy consumed for the operation of the Plant will be borne by BWSSB up to the amount corresponding to the guaranteed specific energy consumption specified by the Contractor .

6. OPERATION AND MAINTENANCE

This section applies to the specifications of materials used for operation and maintenance, the workmanship, period for routine maintenance, specifications for the acceptable quality of plant

effluent, maintenance of records, and responsibilities during operation and maintenance period. The Contractor shall provide access to the Site for the Engineers for the purpose of monitoring the Contractor's Operation and Maintenance activities. The Contractor shall train the BWSSB personnel who will operate the plants for the last year of the 5-years Operation and Maintenance period.

16.1 Operation and Maintenance Requirements

The Contractor shall operate and maintain all the works and plants of the Sewage Treatment Plant(s) (STPs) and Terminal Sewage Pumping Station(s) (TSPSs) under the Contract complete including the road works, landscaping, civil/structural, mechanical components instrumentation system, Electrical System of STP&ISPS/TSPS, SCADA systems, all utility and ancillary buildings, TSPS and STP premises area for the period of Seven (5) years from the date of successful completion of "Tests after Completion of the Works".

The Contractor shall make his own arrangements at his own cost for plant operation personnel, chemicals usage, lubricants, diesel, spares, tools and tackles, routine maintenance, sampling and analysis, screenings and grit collection, transportation and disposal, dewatered sludge disposal in co-ordination with BWSSB, Karnataka State Pollution Control Board (KSPCB), Karnataka Power Transmission Corporation Ltd. (KPTCL) authorities and any other activity required for the operation and maintenance of the works / plants in full compliance with all applicable rules, regulations, laws, codes, effluent quality requirements and any other limitations.

During the Operation and Maintenance period, the Contractor shall collect, transport, and dispose of the screenings, grit, and dewatered sludge cake in full compliance with all applicable laws, rules, and regulations and as per the instructions of BWSSB's engineer in charge of plant.

The Contractor shall submit a weekly report to the Employer detailing the Operation and Maintenance indicating the labour hours expended, Electrical Power Consumed, Chemicals and other Consumables consumed and also any problems including troubleshooting faced and rectified. The report shall also include full details including photos

The Contractor shall submit detailed schedule/manual of all O&M activities and contents with references of equipment manufacturers

The Contractor shall carry out all O&M activities as per the approved Operation and Maintenance Manuals.

During the Operation and Maintenance period, the Contractor shall ensure that the stipulated design effluent standards are met in accordance with the specifications in the Bid documents.

The Contractor's responsibility shall also include the safety and security of the works / plants during the course of Operation and Maintenance.

During Operation and Maintenance period, the Contractor shall appoint a Plant In-Charge, Lead Operator and Laboratory Technician'. In addition, the Contractor shall appoint suitable number of operators, fitters, electricians, helpers, gardeners, office peons, security guards, labourers as required for the

operation and maintenance of the plants for three shifts and adequate other staff / supporting personnel during general shift. And if any O&M staff is on leavehe has to provide replacement immediately for that place for not hampering operation and maintenance of the plant.

Key O&M personnel shall have minimum qualification and experience as given below:

Minimum Staff and Qualifications Requirements during O&M Period for STP

Sr.		Designation Qualifications	Experience Years	Total No for , each STP
I	Plant Manager	Graduate/Post Graduate in Civil, Public Health, or Environmental Engineering with specializationin wastewater collectionandtreatment and having experience in STP and Sewage Pumping StationsTesting,	5yrs in UWTP with SBR technology	I .
2	Plant Supervisor	Graduate in EEE. Shall have completed at least one CPHEEO advanced Wastewater Operations course or equivalent and should	3 yrs experience in UWTP with SBR technology.	I
3	Operator	Diploma in Civil, Public Health, or Environmental Engineering. Shall have completedat least one CPHEEO	3yrs experience in UWTP with SBR technology	4 (Three Shifts, I for each shift and one in general shift)

4	Chemist	Graduate in Environmental science/Chemistry.Shall have completed at least one CPHEEO advanced Wastewater Operations	2yrs experience in STP laboratory	1
5	Electrician	ITI Certification in Electrical	2yrs experience in UWTP	1
6	Instrumentation and Control Technician-	Diploma Certification in Electrical /Instrumentation Engineering and should have certification of basic computer course along with knowledge of MS office for reporting etc…	2yrs experience in UWTP Operation &Maintenace.	1
7	Fitter/ Mechanic-	ITI Certification in Electrical Engineering	2yrs experience in UWTP	4 (Three Shifts, I for each shift and one in
8	Peon	-	-	1
9	Security Guards for			3
10	Gardeners	-	-	3

11	Helpers	-			3
			3	Operator	
			4	Chemist	

Note:

a. *The above requirement is minimum only. The Contractor will arrange extra work force, as and when required, so as to smoothly run the operation and maintenance including preventive maintenance, repairs etc. and general cleanliness of the installations.*

b. *The above staff strength is exclusive of leave reserve required for different category of staff. The Contractor shall ensure availability of the personnel given in the above table for all seven days in a week.*

c. *The Contractor shall make appropriate arrangements for maintenance of items like road work buildings, arboriculture, patrolling and maintenance of civil structures, vehicle operations and other activities defined to fulfill its obligations under O&M Contract.*

d. The Contractor shall furnish complete resumes/biodata for all personnel proposed 15 days before the start of Operation and Maintenance period to the Engineer for approval.

e. *During course of Operation and maintenancebefore changing any O&M staff as approved during start O&M BWSSB's engineer approval has to be obtained and to appoint new*

staff also BWSSB's engineer approval is mandatory and O&M staff should be interviewed by BWSSB's engineer before appointing new O&M.

f. *If any O&M staff is not working to satisfaction of BWSSB engineer he should be removed within seven days after the instructions of the BWSSB engineer and operator has to provide replacement after approval of BWSSB engineer.*

g. 16.2 Typical items in TSPS& their checks

h. The purpose of maintenance is shown below.

i. -Pump up sewage to sewage treatment plant etc.

Operation surveillance work is the surveillance of apparatus operation, apparatus operation at the time of usual, a pumping mode at the time of heavy rain, and correspondence at the time of a power failure. Preservation work is an inspection check, a periodic check, apparatus maintenance, repair of failure apparatus, cleaning, etc.

The item of the main preservation work is shown below.

Name of Facility	Daily	Periodic	
	Point to be checked	Frequen	Point to be checked
Motorised Gates	-Check Smooth-Operation -Check safety equipment	Weekly	-Check Greases up &Oils -Smoothness of operation (Fully
		Monthly	-Check opening-and-
Wet well, Channels and	-Removal of floating matter -Check of a	As needed	-Cleaning of a sediment -

Coarse screens	-Check Smooth-Operation -Check of the difference of the water level before and behind a screen -Remove un-removable floating matter on. screens -	Monthly	-Adjustment of take-up for Drive chain -Check Screen- shape -Check Operation of a wiper -Adjustment of space between
Screening Conveyor	-Check Smooth-Operation-Abnormal noise - Meandering of a belt -Check	Weekly	-Grease up & Oils

Name of Facility	Daily	Periodic	
	Point to be checked	Frequen	Point to be
1.HEAD WORKS/MEDIUM SCREEN INLET			
Medium Screen	-Check Smooth-Operation -Check of the difference of the water level before and behind a screen -Remove un-removable	Monthly	-Check Screen-shape -Operation of a wiper - Adjustment of space between rakes and a screen -Check of the lubricating oil
	-Check Smooth-Operation - Abnormal noise -	Weekly	-Check Grease up &Oils -Check emergency stop

Screenings Conveyor	Meandering of a belt -Check Smooth-Operation -Check scraper	Monthly	-Check Damage to a belt -Check Slack of a belt& adjustment of
2.HEAD WORKS/GRIT BASINS			
Grit Collectors	-Abnormal noise -Check Smooth-Operation	Weekly	-Check grease up & Oil level of reduction
		Every 6	-Check *of* shaft rotation
		Yearly	-Dry basins for damage, space betwee
		D E	
Organictittr	-Check Smooth-	Monthl	-Cleanup with water

Name of Facility	Daily	Periodic	
Pumps	Point to be checked	Freque	Point to be checked
	-Check discharge rate, pressure, abnormal noise, heat &vibration -Check liquid	Every 6 Months	-Check pump damage Check wear of pump impeller
		Every 1-3	-Check pump performance &
Inclined Grit Removal Equipment	-Check Smooth-Operation -Check discharge rate, abnormal noise	Weekly	-Check grease up & Oil level of reduction gear
		Monthly	-Check emergency stop. system
		Every 6 Months	-Check of shaft speed -Check
Grit Conveyor	-Check Smooth-Operation -	Weekly	-Check grease up & Oils -Check

	Abnormal noise - Meandering of a belt -Check Smooth-Operation -Check scraper	Monthly.	-Check damage to a belt -Check Slack of a belt& adjustment of
3. AERATION ZONES			
Air Diffusers Assembly	-Check mixing condition in the zone -Check air flow rate & pressure	Every 6	-Check the diffuser lifting equipment for performance and
		As needed basis	-Check the air flow rate and size of air babble -Check diffuser .performance
o Ct r			

Name of Facility	Daly	Periodic	
	Point to be checked	Freque	Point to be checked
			material between diffuser and
Mixed Liquor Recycle	-Check Smooth-Operation -Check discharge rate, pressure, abnormal noise -Check safety equipment	Monthly	-Check pump damage -Check the pump lifting equipment for
		Every 6	-Check wear of pump impeller
		Every l-3 Year	-Check pump performance
Monorail Motorized Hoist	-Check Smooth-Operation -Check all lifting equipment including wire and hook -Check lifting	Monthl	-Check End-stop
		As needed basis	-Check travelling speed -Check hoist rails, structure & support
4. PROCESS AIR BLOWER BUILDING			

Air Blowers	-Check Smooth-Operation -Check discharge rate, pressure, abnormal noise, heat and vibration	Weekly	-Check grease up & Oil level of reduction gear box -Check safety
		Every l•-•3	-Check Blower
		As needed	-Check blower system .-Check
-EOT Crane/Hoist	-Check Smooth-Operation • -Check all lifting equipment including wire and hook -Check lifting	Monthl	-Check End-stop
		As needed basis	-Check traveling speed -Check rails,
			•
.	vibration '-Check safety		

Name of Facility	Daily	Periodic	
	Point to be checked	Freque	Point to be checked
Alum Dispersion Raid Mixer	-Check coagulation condition in secondary clarifier -Check abnormal noise & vibration	Every 6	-Check the mixer lifting equipment for performance
		Yearly	-Check smoothness of mixer
5. CHEMICAL BUILDING (Alum Building)			
Alum Solution Tanks	-Check corrosion condition -Check leakage	Weekly	-Remove deposition substance -Clean
Alum Solution Tank Mixers	-Check Smooth-Operation -Check abnormal noise& vibration	Weekly	-Clean up mixer
		Monthl y	-Check mixing speed -Check shaft and

Alum Dosing Pumps	-Check Smooth-Operation -Check discharge rate	Monthly	-Check accuracy of flow
		Every 1-3	-Check pump performance
Flow Indicator	-Check flow indicator -Check	Weekly	-Check accuracy of flow
Monorail Motorized Hoist	-Check Smooth-Operation -Check all lifting equipment including wire and hook -Check lifting	Monthl	-Check End-stop
		As needed basis	-Check travelling speed -Check hoist rails, structure & support
6. WASTE ACTIVATED SLUDGE (WAS) PUMP STATION			
Waste Activated Pump	-Check Smooth-Operation	Month	-Clean up with
		Every 6	*rmrt-ntznAntoT*
Name of Facility	Daily	Periodic	
	Point to be checked	Freque	**Point** to be
	heat and vibration -Sludge leakage	Every 1-3	-Check pump performance
Monorail Motorized Hoist	-Check Smooth-Operation -Check all lifting equipment including wire and hook -Check lifting	Monthl	-Check End-stop
		As needed basis	-Check travelling speed -Check hoist rails, structure & support
7. SBR SCUM PUM PIT			
Scum Pumps	-Check Smooth-Operation -Check discharge rate, pressure, abnormal noise -Check safety equipment	Monthly	-Check pump damage -Check the pump lifting equipment for
		Every 6	-Check wear on pump impeller
		Every 1-3	-Check pump performance
8.CHLORINE BULDING (Sodium HypoChlorite)			

Liquid Chlorine Receiving mouth/Tanks Equipment	-Check HCIO solution leakage from the receiving/tanks equipment/pipe /valves -Check solution level -	Weekly	Check HCIO concentration value Check receiving liquid only Sodium Hypochlorite (Miss receiving may be caused by
9. PLANT WATER PUMP STATION			
Submersible Pumps	-Check Smooth-Operation -Check discharge rate,	– Monthly	..._geick-ptr$_{ij}$ $^{1}/_{4}$irdamage Check thew trip Mr
Name of Facility	Daily	Periodic	
	Point to be checked	Freque	Point to be checked
			-Clean up with
		Every6	-Check wear on pump impeller
		Every l —3	-Check pump performance
Monorail Motorized Hoist	-Check Smooth-Operation -Check all lifting equipment including wire and hook -Check lifting	Monthl	-Check End-stop
		As needed basis	-Check travelling speed -Check hoist rails, structure & support
10. GRAVITY THICKENER			
Thickener	-Check Smooth-Operation- Abnormal noise -Removal scum	Weekly	-Check grease up & Oil level of reduction gears - Remove scum& cleaning -Clean
		Monthly	-Check emergency stop
		Every6	-Check peripheral velocity

(Center Column)	-Check safety equipment	Yearly	-Dry basins for checking of damage. space
11. THICKENED SLUDGE PUMPS			
Thicken Sludg ed e Pumps	-Check Smooth-Operation . -Check discharge rate, pressure, abnormal noise, heat and vibration	Weekly	-Clean up with
		Every 6 Months	-Check pump rotor -Check flow rate
		Every Year	-Check pump
		Tour	DEGREMONT 2

Name of Facility	Daily	Periodic	
	Point to be checked	Frequen	Point to be
12. SLUDGE STORAGE TANK			
Sludge Storage tank Mixers	-Check mixing condition in the zone	Every 6 Months	-Check the mixer lifting equipment for performance and smoothness
		Yearly	-Check smoothness of mixer operation -Check wear
13. PLANT DRAIN PUMPING STATION			
Pumps	-Check Smooth-Operation -Check discharge rate, pressure, abnormal noise -Check safety equipment	Monthl y	-Check pump damage -Check the pump lifting equipment for
		Every6	-Check wear on pump impeller -Pump speed &
		Every 1-3	-Check pump performance
14. CENTRIFUGE BULDING			

Centrifuge Feed Pumps	-Check Smooth-Operation -Check discharge rate, pressure, abnormal noise, bearing temperature & vibration	Weekly	-Check grease up & Oil level of reduction gear
		As needed basis	-Check pump performance
Name of facility	Daily	Periodic	
	Point to be checked	Freque	Point to be checked
Dewatering Centrifuges	-Check Smooth-Operation -Check pressure, abnormal noise, bearing temperature& vibration -Check feeding sludge concentration and ratio of Polymer dosing -Check cake moisture and G-value	Monthly	-Check quality of oil in reduction gear box -Check all safety
		Every 1-3	-Check dewatering
		As needed basis	-Check dewatering centrifuge system -Check space between screw and casing
Conveyer(Sludge Cake)	-Check Smooth-Operation -Abnormal noise -Meandering of a belt -Check Smooth-Operation -Check scraper	Weekly	-Check grease up & Oils -Check
		Monthly	-Check damage to a belt -Check Slack of a belt & adjustment of
Cake Hopper	-Check Smooth-Operation -Check abnormal noise& vibration	Weekly	-Check grease up & Oils -Check gate performance -Check position of liquid

	-Check gate operation on opening and closing	As needed basis	-Check cake hopper assembly
Powder Polymer Storage	-Check Smooth-Operation -Check liquid -Check	Weekly	-Cleaning dust off

Name of Facility	Daily	Periodic	
	Point to be checked	Freque	Point to be checked
	vibration -Check no polymer	As needed basis	-Check powder polymer
Auto Feeder	-Check Smooth-Operation -Check abnormal	Weekly	-Check feeding accuracy -Clean up
		As needed	Check the feeder
Polymer Batch Tanks	-Check corrosion condition -Check leakage	Weekly	-Remove deposition substance -Clean
Polymer Mixers	-Check Smooth-Operation -Check abnormal noise& vibration	Weekly	-Clean up mixer
		Monthly	-Check mixing speed -Check shaft and coupling
Polymer Feeding Pumps	-Check Smooth-Operation -Check discharge rate,	Monthly	-Check accuracy of flow
		Every 1-3 Year	-Check pump performance
Motorized Monorail Hoist	-Check Smooth-Operation -Check all lifting equipment including wire and hook -Check lifting	Monthl	-Check End-stop
		As needed basis	-Check travelling speed -Check hoist rails, structure & support
15. SEQUENCING BATCH REACTOR (SBR)			
	-Check overflow weir and .	Daily .	-Smooth discharge and

Decanters (Over „..< .serno$_i$l•-\\	water level control _. .	DE C	stable overflow from ‘..

Name of Facility	Daily	Periodic	
	Point to be checked	Frequen	**Point to be**
	-Check decanter supports		

16.4 Operation & Maintenance practices (Electrical)

16.4.1 Typical items in Electrical Facility & their checks

Diesel	1 .Verification of Engine oil level, Engine oil leakage, air & oil filters,' cooling fans, fuel level, water level etc. 2.Verification of battery voltage, charging &self start. 3.Verification of abnormal sound , vibrations etc. 4.Verification of Voltage, current, frequency, RPM,	Every 250hours/6 Months	I. Verification of Conditions of filters. 2.Verification of Condition of cooling fan. 3. Verification of Condition of battery & charger. 4.Verification of self start system 5.Verification ofcondition of engine ,alternator& accessories , doors of acoustic enclosure, exhaust system etc.
Cable system	Verification of short circuit, burning smell ,	Every 6 Months	Verification of voltage drop, damage, insulation
Lighting Fixtures	Verification of working of lamps & ballasts.	Every 6 Months	1. Verification of illumination level 2.Verification of condition of lamps &' ballasts.

Switch board	Verification of operation of	Every 6 Months	Verification of condition of switches , sockets &fan
Switch Socket	Verification of operation of Switch &	Every 6 Months	Verification of condition of Switch & Sockets
Ceiling Fan .r .3 Irk	Verification of operation of Fan. .	Eve ry	Verification of condition of fan. 2.Verificat See ...„.—
Power sockets	Verification of operation of MCB,	Every 6 Months	Verification of condition of
General	I. Inspection of General appearance of various /items. 2. Verification of Cable	Every 6 Months	1.Verification of condition of cables, wires& 2.Verification of Insulation resistance of individual 3.Verification of Condition Connectio

16.4.2 Electrical System Operation Practices

- All the electrical equipments shall be handled and operated by a trained and authorized person only. All the equipment shall be checked for its proper earthing and loose connections prior to start the equipment. Naked wire, loose connections and faulty connections shall be repaired immediately prior to start for operation.
- Electrical sockets and switch shall not be touched by bare or wet hands. If there is any live wire found naked or on wet ground, main switch shall be turned off first then the wire shall be repaired or moved.
- For any electrical works proper insulated tools shall be used. Do not try to use tools made for other purpose; it may be hazardous.

16.5 Operation & Maintenance practices (Instrumentation, Control & Automation)

(a) General maintenance

A comprehensive maintenance program is critical to attaining long-term reliable performance of SCADA Systems / ICA systems. Periodic device calibration, preventive maintenance, and testing allow potential **problems to** be identified before they can cause mission failure. Prompt corrective maintenance assures reliability by minimizing downtime of redundant components.

The EPC or Turnkey contractor has to enter in to AMC contracts with system / equipment suppliers of ICA, as necessary. It is mandatory to enter into an agreement for a 5 years operation and maintenance contract with the instrumentation, PLC and SCADA system supplier and wireless communication supplier or the authorized system integrator, whosoever has executed the work for this .project.

(b) Preventive maintenance

The SCADA system should be part of the overall preventive maintenance (PM) program for the facility.

Table below provides a list of rccommended maintenance activities and frequencies for ICA systems and their components.

Preventive maintenance schedules for ICA components and subsystems should be coordinated with those for the mechanical/electrical systems they serve to minimize overall scheduled down time.

Activity	Frequency
Pneumatic Systems/Components/Instruments	

Check Regulators and Filters	Monthly
Inspect Tubing and Piping	Monthly
Actuate Pressure Switches	3 months
Calibrate Switches and Sensors	Yearly
Calibrate Pressure Gauges	Yearly
Calibrate Level Transmitters	Yearly
Calibrate Flow transmitters	Yearly
Calibrate Pressure Transmitters	Yearly
Calibrate Thermometers	Yearly
Calibrate Analytical Instruments/Online	6 Months
Change Sampling solution of Analytical	As required
Electronic Systems	
Lamp TestNerify Indicators	Monthly
Inspect Enclosures for Dirt, Water,	Monthly
Run PLC Diagnostics	3 Months
Calibrate Sensors and Transmitters	Yearly
Calibrate Meters	Yea
PLC Conuqunication Modules	Mo lily ,,,,' ...it
PLE-Wries-N$^{i}_{c}$-•\	

Activity	Frequency
Test Automatic control Sequences	Monthly
Verify Alarms	Weekly
Software Maintenance and	3 m onths
Anti-virus Definition Updates	Monthly
Inspect Wire, Cable and	Monthly
Inter site Communication Network	Weekly
Dead Bus Relays	3 Months
UPS setting with SCADA	Weekly
PLC Redundant Power back up	Monthly
SCADA Redundancy	Monthly
Network Redundancy	Weekly
PLC Hot-Standby	Monthly
Historian Package(Capacity)	Monthly
Data Archiving	Monthly

a. Many components of SCADA systems, such as dead-bus relays, are not required to function under normal

system operating modes. For this reason the system should be tested periodically under actual or simulated contingency conditions. These tests should approach as closely as possible the actual off-normal conditions in which the system must operate.

For example, SCADA for Dual Redundant system should be tested by interrupting the utility source as far upstream of the normal service as possible.

b. Periodic system testing procedures can duplicate or be derived from the functional performance testing procedures.

c. The SCADA software maintenance should include timely updates of any new versions from the supplier and testing to verify proper installation on the SCADA computer. In addition, software antivirus updates should be maintained. This should be performed any time after the computer is connected to the Internet or the antivirus patch should be downloaded as and when the updates are available. Normal operation requires that the SCADA computer not be connected to the Internet.

Faulty Instruments, sensors, transmitters, communication modules, computer hardware should be replaced with new components. Repair of the items would not be accepted.

(c) Concurrent maintenance

Concurrent maintenance is defined as testing, troubleshooting, repair or replacement of a component

with equipment that has redundancy and therefore are not themselves redundant, their maintenance should be scheduled to occur during maintenance of the associated equipment. SCADA components and controllers that are redundant must be capable of being taken out of service, repaired or replaced and tested without interfering with the operation of the redundant component.

(d) Reliability centered maintenance

Reliability-Centered Maintenance (RCM) is an approach for developing an effective and efficient maintenance program based on the reliability characteristics of the constituent parts and subsystems, economics, and safety. RCM provides a logical, structured framework for determining the optimum mix of applicable and effective maintenance activities needed to sustain the operational reliability of systems and equipment while ensuring their safe and economical operation and support.

A significant byproduct of the application of SCADA systems to the control of facilities is the large amount of operational data made available through the trending and data storage features of the SCADA. This operational data can be used for automated performance monitoring of mechanical and electrical systems that can support a RCM approach

(e) Operations and maintenance documentation

The contractor should perform an O&M analysis to determine the O&M data required to support maintenance of the SCADA system . This analysis should be coordinated with BWSSB to determine maintenance parameters and O&M data that are available. Typical O&M data requirements include the following items:

a. System documentation as defined in FDS, FAT & SAT documents
b. Minimum spare parts list.
c. Recommended spare parts list.

d. Recommended onsite test equipment.

e. Recommended O&M training.

f. Recommended O&M to be performed by contractor

(t) Spare parts stocking

An adequate on-site stock of spare parts is essential to obtaining high availability of ICA systems.

All spare parts used for the equipment in the maintenance of the system must be from the manufacturer of the equipment or, if the equipment itself has been made with parts from othermanufacturers, the parts must be of the same make as used in he equipment supplied and in

All spare parts shall be packed for long storage under the climatic conditions prevailing at the Site. Each spare part shall be labelled on the. outside of its packing with its description, number and purpose and, if more than one spare is packed in a single case, a general description of the case contents shall be shown on the outside and a packing list enclosed.

Minimum recommended stocking levels include the following. These quantities may need to be increased for components which are used in large numbers in the facility:

(1) Manufacturer's recommended spare parts list.

(2) One each of all line replaceable boards or modules.

(3) Six each power and control fuses used in the system.

(4) Tools required to terminate coaxial on fiber optic cables.

Automation:

(1) Laptop computer loaded with software required to access controllers.

(2) Licenses for all software installed on the system.

(3) Permission to modify program code.

(4) Spare cables for connecting computer to controllers.

(5) PLC CPU, Power supply module,l DI,DO,AI,AO modules, Communication module, protocol converter etc..

(6) PLC batteries, fuses, etc.

(g) Utilities & Consumables

The contractor has to provide consumables for printers e.g.: Ink cartridges (color & B/W), A4, A3, Al size of paper, dot-matrix print paper for a period of 4 years.

Downtime of the above system should not exceed more than 2 hours.

(h) Technical support

The Contractor should specify functional areas of the operating system and/or equipment where a technical representative will be furnished by the manufacturer for training, test, checkout, validation, or

pre-operational exercises.

Ongoing O&M of SCADA system software may require technical support from the system vendor orpersonnel not located at the facility. Commercial SCADA software typically

Such remote access provisions represent 'a vulnerability to "hacking" and must be used with great caution. They should be monitored when in use and physically disconnected when not in use.

Password protection policies for all SCADA systems, including PLC's, shall be in compliance with Established policies and to be agreed with the employers representative.

These policies require that the default password that came from the control supplier be changed when Placed into operation at the facility.

Note:-

(a) During commissioning, Trial run and testing the Charges / Costs towards the following items shall be borne by the contractor.

- Network Operating charges for Wireless communication System (GPRS gateway)
- Software updates, consumables and stationeries etc..,
- Instrumentation (Analog) & Control Cables and Power Cables, OFC, etc. If any required.
- Painting for field Instrument enclosures.

(b) During O&M Period :

- Contractor can Quote Network Operating charges for Wireless communication (GPRS gateway) yearly wise.

16.6 Issue of Completion Certificate for Operation and Maintenance

The Employer shall issue a Completion Certificate for "Operation and Maintenance" after successful completion of O&M by Contractor to the satisfaction of the Employer.

25. BWSSB MAY TERMINATE THE CONTRACT IN CASE OF INSOLVENCY OR WANT OF DUE DILIGENCE

1. **Termination for Insolvency**

   a. The Owner may terminate the contract immediately by issuing a written notice if the Operator:

   - Becomes insolvent or is adjudicated as bankrupt.
   - Enters into liquidation or any arrangement with creditors due to financial instability.
   - Has a receiver, trustee, or administrator appointed over its assets.

   b. Upon termination for insolvency, the Owner shall have the right to:

   - Take over the operation and maintenance of the STP.
   - Retain any payments due to the Operator for offsetting losses or damages incurred by the Owner.

2. **Termination for Want of Due Diligence**

   a. The Owner may terminate the contract if the Operator fails to demonstrate due diligence in performing its obligations, including but not limited to:

   - Consistent failure to meet operational or maintenance standards.
   - Negligence leading to damage, accidents, or non-compliance with environmental and safety regulations.

- Repeated delays or lack of progress in addressing performance deficiencies.

  b. The Owner shall provide a written notice detailing the deficiencies and allow a reasonable period for the Operator to rectify them.

  c. If the Operator fails to address the deficiencies within the specified period, the Owner may terminate the contract and recover any associated losses.

3. **Consequences of Termination**

   a. Upon termination, the Operator shall:

   - Cease all activities related to the STP as directed by the Owner.
   - Handover all plant equipment, records, and assets in good condition.
   - Settle any pending liabilities, including payments to workers or subcontractors.

   b. The Owner shall have the right to:

   - Engage a third party to take over the O&M activities.
   - Recover costs incurred due to termination, including losses resulting from operational disruptions.

4. **No Compensation for Termination**

   In case of termination for insolvency or want of due diligence, the Operator shall not be entitled to any compensation or claims for loss of profit or business.

5. **Arbitration for Disputes**

   Any disputes arising from the termination shall be resolved as per the dispute resolution or arbitration mechanism outlined in the contract.

Should the Operator during the continuance of the contract die or become bankrupt or insolvent or go into liquidation or should he suspend payment or compound with his creditors or from any other cause whatever become

unable or fail to carry on the contract with efficiency or should he not progress with any portion of the work assigned to him in the programme given by the Owner’s Representative from time to time in the manner intended by the contract or not have work ready in conformity with the terms of the contracts or should his preparations for commencement and his subsequent rate of progress be slow from any cause whatever that be in the opinion of the Owner’s Representative or his representative, he shall be unable to carry out the work by the expiration of the specified period or should he refuse or neglect to comply with the directions given to him by the Owner’s Representative or his representative or in any other respect act contrary to the terms of the contract, the Board shall have power to declare the contract at an end in which case, the Operator shall only be paid for such portion of the work as shall have been actually delivered in a serviceable condition at the date of such declaration after due deduction of any sum that may be leviable under this contract. The Operator shall in addition be liable to pay to the Board or the Board at their option shall be entitled to further deduct the amount of all losses, damages or expense (including any excess difference between the contract price of the works to be done under this contract or such portions thereof as may not have been delivered at the date of such declaration as aforesaid and the price which the Board may have to pay for the similar work provided in lieu of such portion as may not have been so delivered) which the Board may be put to or sustain by reason of in consequence of the Operator’s breach of contract. The above liability shall be in addition to forfeiture of the retention money and the security deposit specified.

26. MEASUREMENT OF WORK

 The measurement of work under the operation and maintenance of the Sewage Treatment Plant (STP) shall include all activities and services related to the operation, upkeep, repair, and performance monitoring of the STP as outlined in the contract. This includes but is not limited to:

- Routine operational tasks (e.g., monitoring, testing, and adjusting plant systems).
- Preventive maintenance activities (e.g., cleaning, lubrication, calibration).
- Corrective maintenance (e.g., repairs, replacement of parts).
- Emergency response services.
- Performance assessments and reports.

Method of Measurement

a. **Daily or Monthly Records**

- The Operator shall maintain daily records of activities performed and resources used. These records will be submitted to the Owner on a monthly basis or as specified in the contract or as per the instructions/requirement of employer representative .

b. **Performance Indicators**

- The Operator's performance shall be measured against key performance indicators (KPIs) established in the contract, such as wastewater quality, treatment capacity, downtime, and adherence to safety and environmental standards.

c. **Work Orders and Reports**

- For any maintenance, repairs, or emergency work carried out, the Operator shall issue work orders and provide detailed reports documenting the nature of the work, materials used, and time spent.

Verification and Inspection

a. The Owner or their appointed representative reserves the right to inspect and verify the measurement of work performed by the Operator at any time.

b. The Owner may conduct random audits of maintenance logs, equipment performance, and operational efficiency to ensure compliance with the contract terms.

c. All measurements shall be based on actual physical work performed or outputs delivered, as verified through inspection or testing.

Payment for Measured Work

a. Payments to the Operator for work completed shall be based on the measured quantities of work performed, as documented and verified by both parties.

b. If the Operator is required to perform additional work beyond the contracted scope, payment will be based on mutually agreed rates for extra work or services.

c. The Owner may withhold payment if the measurement of work is incomplete or if there are discrepancies in the records.

Disputes Over Measurement

a. In the event of any disagreement or dispute regarding the measurement of work, both parties shall attempt to resolve the matter through mutual negotiation.

b. If a resolution cannot be reached, the matter will be referred to the dispute resolution procedure outlined in the contract, which may include arbitration or other methods.

Documentation and Reporting

a. The Operator shall submit monthly reports documenting:

- Total work performed.
- Work progress, including any delays or issues.
- Performance data and maintenance logs.

  b. Reports must be signed by both the Operator’s representative and the Owner’s authorized personnel to confirm the accuracy of work measurements.

Final Measurement and Close-out

a. Upon completion of the contract, a final measurement will be taken to verify all work completed and determine the final payment due to the

Operator.

b. Any discrepancies or incomplete work will be addressed before the final close-out of the contract.

AE/ JE will measure the work monthly. Payment may be made on the monthly rate as per the agreement and based on the satisfactory compliance of the contract, as per schedule in the agreement. The Operator will be at liberty to accompany the AE/ JE in order that they may agree on the measurements but should he neglect to do so, the measurements as recorded by the said officers shall be taken as final and conclusive.

The operator has to submit the bill in four copies along with the monthly reports and GST FORM-3B of previous RA Bills etc. The monthly reports should be signed by the concerned AE/JE, AEE and the Operator before submitting the bill. The bill format should be in the format as instructed by the BWSSB's engineer in charge of the plant.

The recorded measurements will be paid once in month. The statutory deductions such as Income Tax, Work Contract Tax (if applicable) will be deducted in the R A bills in the prevailing rates.

27. PROTECTION AGAINST CLAIMS FOR THE USE OF PATENTS

Protection Against Claims for the Use of Patents

1. **Indemnity for Patent Infringement**
   The Operator shall fully indemnify and hold harmless the Owner, its employees, agents, and contractors against any claims, damages, liabilities, or expenses arising from the infringement of any patents, trademarks, copyrights, or intellectual property rights resulting from the use of equipment, machinery, technology, or processes

employed during the operation and maintenance of the Sewage Treatment Plant (STP).

2. **Responsibility for Patent Fees**
   a. The Operator shall bear all costs associated with defending any claims or suits brought against the Owner for patent infringement.
   b. The Operator shall be responsible for any royalty fees or other charges payable to patent holders for the use of patented technologies, products, or processes in connection with the STP's operation and maintenance.

3. **Notification of Patent Claims**
   a. If any third-party patent infringement claims are made against the Operator or the Owner, the Operator shall promptly notify the Owner of such claims.
   b. The Operator shall provide reasonable assistance to the Owner in the defense of any patent-related claims, including access to relevant documentation, technology, and personnel.

4. **No Use of Infringing Materials**
   The Operator shall ensure that no patented materials or technologies used in the operation or maintenance of the STP infringe upon existing patents, trademarks, or other intellectual property rights. If the Operator is made aware of any potential infringement, it shall immediately cease the use of such materials or technologies and replace them with non-infringing alternatives, at its own cost.

5. **Ownership of New Inventions or Improvements**
   a. Any new inventions, improvements, or innovations developed by the Operator during the term of the contract related to the operation or maintenance of the STP shall be the property of the Operator unless otherwise agreed in writing.
   b. The Operator shall ensure that no such inventions or

improvements infringe upon the intellectual property rights of third parties.

6. **Liability for Third-Party Claims**
   a. If a claim for patent infringement is made by a third party as a result of the Operator's use of patented materials or processes, the Operator shall:
      - Defend the claim at its own expense.
      - Bear any settlement costs, fines, or penalties imposed by the court or applicable authorities.

      b. In case the Owner is required to settle any such claim or pay damages, the Operator shall reimburse the Owner in full for any amounts paid, including legal costs.

7. **Protection Against Future Claims**
   The Operator agrees to maintain, at its own expense, licenses, patents, or other intellectual property rights necessary for the continued operation and maintenance of the STP, ensuring that no future claims for patent infringement arise from its use of such technologies.

8. **Dispute Resolution**
   Any dispute arising from patent infringement claims or related intellectual property issues shall be resolved through the dispute resolution procedure specified in the contract, which may include arbitration or other methods agreed upon by both parties.

All fees for any patented invention, articles or arrangement, that may be used or in any manner connected with the maintenance of the works or any part thereof embraced in these specifications, shall be included in the price mentioned in the bill of quantities and Operator shall protect and hold harmless the Board against any and all demand for such fees or claims and before the final payment and settlement is made on account of

this contract; the Operator, if required must furnish acceptable proof of proper and satisfactory release from all such claims.

28. AUDITS

Right to Conduct Audits

The Owner reserves the right to conduct audits at any time during the term of the contract to ensure that the Operator is complying with all contractual obligations and performance standards related to the operation and maintenance of the Sewage Treatment Plant (STP). These audits may include, but are not limited to:

- Operational performance and efficiency.
- Compliance with safety, health, and environmental regulations.
- Financial records related to expenditures and billing.
- Maintenance records, including preventive and corrective actions taken.
- Documentation related to staff training, certifications, and safety measures.

Audit Frequency and Notification

a. The Owner may conduct audits on a regular basis, as specified in the contract, or on an ad-hoc basis whenever deemed necessary.
b. The Owner shall provide written notice to the Operator at least ___ days in advance of an audit. However, in cases of suspected urgent issues, the Owner may conduct immediate audits without prior notice.

Audit Process

a. **Scope and Access**

- The Operator shall grant the Owner and its authorized representatives full access to all relevant records, documents, facilities, and personnel during the audit.

- The audit may be conducted on-site at the STP or remotely by reviewing records and reports submitted by the Operator. b. **Audit Team**
- The Owner may appoint third-party auditors or internal personnel to perform the audit.
- The Operator shall cooperate fully with the audit team, providing necessary documentation and facilitating the audit process.

Cooperation and Assistance

The Operator shall provide all necessary cooperation and assistance during the audit process, including:

- Furnishing records, reports, and other documents as requested.
- Allowing access to personnel and staff involved in the operation and maintenance activities.
- Providing explanations or clarifications related to audit findings when necessary.

Audit Findings and Reports

a. Upon completion of the audit, the Owner shall issue a report summarizing the findings, including any discrepancies, deficiencies, or areas of non-compliance identified during the audit.
b. The Operator shall review the report and, within ___ days, provide a written response to the Owner, outlining corrective actions or explanations for any findings.

Corrective Actions

If the audit identifies any issues requiring corrective actions, the Operator shall:

- Implement corrective measures within a reasonable time frame as agreed upon with the Owner.
- Inform the Owner of the progress and completion of corrective actions.

- Bear the cost of any corrective actions or improvements necessary to meet contract specifications.

Audit Costs

a. The cost of conducting regular audits shall be borne by the Owner.
b. If the audit reveals substantial non-compliance or deficiencies that result in additional costs (e.g., need for repairs, replacements, or financial adjustments), the Operator shall bear the costs associated with these corrective actions.

Penalties for Non-Compliance

If the audit uncovers material breaches, non-compliance with performance standards, or failure to meet safety and environmental regulations, the Owner may impose penalties as per the terms of the contract. Persistent or significant non-compliance may lead to further actions, including contract termination.

Confidentiality

The Owner agrees to maintain the confidentiality of all proprietary information obtained during the audit process, and shall not disclose such information to third parties, except as required by law or as necessary to resolve issues identified during the audit.

Bangalore Water Supply And Sewerage Board may designate any responsible person to carry out an annual audit of a technical nature in relation to the operation and maintenance of the facilities, to visit and inspect the facilities with the Operator’s officers and staff, upon giving the Operator fourteen (14) days’ notice. Such audit shall be carried out at reasonable times and so as not to impede or otherwise delay the Operator in the performance of the services or its obligations under this contract.

29. PROTECTION OF THE ENVIRONMENT

The **protection of the environment during the operation and maintenance of a Sewage Treatment Plant (STP)** is critical to ensure sustainability and compliance with environmental regulations. Below are some key measures and practices to protect the environment:

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1. Proper Handling and Disposal of Sludge

- Regularly remove and treat sludge to prevent accumulation.
- Use sludge drying beds or digesters for safe handling.
- Dispose of sludge in compliance with local environmental guidelines or reuse purpose it as fertilizer if appropriately treated as per instructions engineer in charge of plant.

2. Effluent Quality Monitoring

- Continuously monitor treated water to ensure it meets discharge standards (e.g., BOD, COD, pH, TSS, and nutrient levels).
- Implement real-time monitoring systems for early detection of process issues.
- Avoid untreated or partially treated effluent discharge.

3. Odor Management

- Use biofilters or activated carbon filters to control foul odors.
- Seal open tanks and channels where possible.
- Ensure regular maintenance of equipment to prevent odor leaks.

4. Energy Efficiency

- Use energy-efficient equipment, such as variable frequency drives (VFDs) and energy-optimized aerators.

- Install solar panels or biogas recovery systems to reduce the STP’s carbon footprint.
- Conduct energy audits regularly.

5. Chemical Usage

- Minimize the use of chemicals, opting for biological treatment methods when possible.
- Properly store and handle chemicals to prevent spills and contamination.
- Ensure all chemical containers are labeled and disposed of safely.

6. Preventing Ground and Surface Water Contamination

- Ensure the integrity of tanks and pipelines to prevent leaks.
- Construct impermeable liners beneath sludge drying beds.
- Avoid direct discharge into water bodies unless treated water meets quality standards.

7. Noise Control

- Use soundproofing measures for equipment such as blowers and pumps.
- Schedule noisy operations during daytime hours.

8. Waste Management

- Segregate and properly manage solid waste from grit chambers and screens.
- Recycle or reuse materials where feasible, such as treated sludge or biogas as per the instructions of the BWSSB engineer in charge.
- Dispose of non-recyclable waste following environmental regulations.

9. Environmental Compliance

- Regularly update operations to align with evolving environmental laws and standards.
- Maintain accurate records of effluent quality, sludge disposal, and energy usage as per the instructions of the BWSSB engineer in charge of the treatment plant.

10. Community and Ecosystem Considerations

- Maintain a green buffer zone around the STP to minimize the impact on nearby residents.
- Educate staff and stakeholders about environmental responsibilities.
- Conduct periodic environmental impact assessments (EIA) and address findings.

The Operator shall take all reasonable steps to protect the environment (both on and off the site) and to limit the damage and nuisance to people and property resulting from pollution, noise and other results of his operations. The Operator shall ensure that air emissions, surface discharges and effluent from the site shall not exceed the values prescribed by applicable law.

30. SERVICE OF NOTICE

For the purpose of this contract, any notice to Operator from the Owner's Representative shall be deemed to be served upon the Operator if it be addressed to him or in which he signs the tender and be handed to him or in the case of a firm to any member of the firm personally or in the case of a company to the Secretary personally or left at his usual place of business or posted to him by a prepaid registered letter properly addressed to the name and address given in his letter of tender or such other address as the Operator may notify in writing to the Owner's Representative for this purpose.

31. Not Used

32. JURISDICTION

All disputes under the contract shall be subject to Court in Bangalore jurisdiction only.

Key Jurisdictional Authorities

a.Local Municipal Authority

- Responsible for overseeing STP operations within the municipal area.
- Handles disputes related to compliance with local environmental and wastewater management regulations.

b.State Pollution Control Board (SPCB)

- Regulates and monitors effluent discharge standards and environmental compliance.
- Deals with violations of environmental laws, such as water and air pollution control acts.

c.National Green Tribunal (NGT) (in applicable countries)

- Addresses environmental disputes related to pollution, environmental harm, and statutory non-compliance.
- Ensures adherence to environmental regulations and remediation of ecological damage.

d.Contractual Jurisdiction

- For disputes between the STP operator and contractors, vendors, or service providers, the jurisdiction is defined in the service agreement or contract.

- Typically includes provisions for arbitration, mediation, or adjudication in case of disputes.

e.Judicial Courts

- Local civil courts or high courts may handle disputes involving contractual breaches or compensation claims.
- Higher courts may be approached for appeals or significant legal challenges.

e.Labor or Industrial Tribunals

- Resolves disputes between the STP management and employees or unions, including issues of wages, safety, or unfair practices.

f.Regulatory Bodies and Local Governance

- Urban Development Authorities or Water Resource Departments may have jurisdiction over broader urban or regional water management disputes.

33. FORCE MAJEURE

Force Majeure refers to unforeseeable and uncontrollable events that prevent or hinder the performance of obligations under a contract. In the context of a Sewage Treatment Plant (STP) during operation and maintenance, invoking a **Force Majeure clause** can protect parties from liabilities arising from such events.

Definition of Force Majeure

Force Majeure events are typically defined in contracts and may include:

- **Natural Disasters**: Floods, earthquakes, tsunamis, hurricanes, or other extreme weather events.
- **Man-Made Events**: Riots, wars, terrorism, or civil disturbances.
- **Government Actions**: Changes in law, regulatory restrictions, or revocation of permits.
- **Pandemics or Epidemics**: Outbreaks like COVID-19 affecting workforce availability or supply chains.
- **Utility Failures**: Prolonged power outages or breakdowns in essential services.

Any delays or failure in the performance of the contract by the Operator shall not constitute default hereunder or give rise to any claims for damages, if any, to the extent that such delays or failure of performance is caused by occurrences such as Acts of God or expropriation or confiscation of facilities by Government authorities, compliance with any order or request of any Government authorities, acts of war, rebellion, sabotage, commotion, insurrection, military action, usurped power, floods, earth quake, calamity, transport strike, general strikes and riots. The question of continuance of the suspension of works due to conditions of Force Majeure or termination of the contract shall be settled by mutual agreement between the Bangalore Water Supply and Sewerage Board and Operator, failing which such agreement shall be settled as provided in clause 35.

34. OPERATORS RESPONSIBILITY

Upon occurrence of an event considered by the Operator to constitute Force Majeure and which affect performance of his obligations, he shall promptly notify the Bangalore Water Supply and Sewerage Board’s representative and shall endeavor to continue to perform his obligations. The Operator shall also notify Bangalore Water Supply And Sewerage Board’s representative of any proposals, including any reasonably alternative means for performance, but shall not effect such proposals

without the consent of the Bangalore Water Supply And Sewerage Board's representative.

35. STAFF WELFARE AND INSURANCE

43.1 All labour and other employees of the Operator should be covered with comprehensive insurance, against all risks especially covered for jobs under hazardous conditions. A photocopy of the policy should be furnished to the Board. The policies should be kept alive till the completion of the contract period.

43.2 The Operator shall produce fitness certificate from any authorized Medical officer of Government Hospital for all the Technical staff and labour staff to be employed.

43.3 The Operator will be responsible to make available the safety equipment and loose tools as required for the work. If the Operator fails to keep the safety equipment and loose tools, the Board will procure the above and the cost will be deducted immediately from the bills payable to the Operator with a penalty of Rs. 2000/- for each occasion.

43.4 Approval of Insurance:- The Operator shall effect all insurance for which he is responsible with insurers and in terms approved by Bangalore Water Supply And Sewerage Board. Each policy insuring against loss or damage shall provide for payments to be made in the currencies required to rectify such loss or damage.

43.5 The Operator shall also insure the facilities of Bangalore Water Supply And Sewerage Board, the Operator and Sub - Operators as co-insured against all loss or damage. The insurance shall cover loss or damage from

a) Force Majeure
b) Theft
c) Replacement of major and critical equipment as per the list.

d) Workmen compensation insurance to cover all the employees as per the labour act and other statutory requirements

43.6 Compliance with conditions of Insurance Policies:- The Operator (and if appropriate, Bangalore Water Supply And Sewerage Board) shall comply with the conditions stipulated in each of the insurance policies. The Operator shall make no material alteration to terms of any insurance without prior approval of Bangalore Water Supply and Sewerage Board. If an insurer makes (or propose to make) any such alteration, the Operator shall notify Bangalore Water Supply and Sewerage Board immediately upon becoming aware thereof.

43.7 Submission of Insurance Documentation:- The Operator shall within 10 days from the date of award submit to Bangalore Water Supply and Sewerage Board,

a) Evidence that the insurance described have been effected and
b) Copies of the policies for the insurance described.

When each premium has been paid, the Operator shall submit copy of the receipts to Bangalore Water Supply And Sewerage Board. The Operator shall be solely responsible for the safety of all related items involved in performance of the contract commencing from the date of handing over. Hence the Operator will be responsible and liable for all events during the period from the date of handing over up to the date of insurance.

43.8 Failure to maintain:- If the Operator fails to effect and keep in force any of the insurance’s required under the contract or fails to provide satisfactory evidence, policies and receipts in accordance Bangalore Water Supply And Sewerage Board may, without prejudice to any other right or remedy, effect insurance for the coverage relevant to such default, any pay the premiums due. Such payments, to the extent they are commercial and reasonable shall be recoverable from the Operator by Bangalore Water Supply And Sewerage Board and may be deducted by Bangalore Water Supply And Sewerage Board from any monies due or become due to the Operator.

43.9 General:- Nothing in this clause limits the obligations, liabilities or responsibilities of the Operator, under the terms of the contract or otherwise. Any amounts not insured or not recovered from the insurers shall be borne by the Operator in accordance with their other obligations under this contract.

36. FACILITIES FOR STAFF AND LABOUR

The Operator shall provide and maintain all necessary accommodation and welfare facilities for his (and his Sub –Operator's) staff and labour. The Operator shall not permit any temporary or permanent living quarters to be maintained within the structures forming part of the facilities.

37. HEALTH AND SAFETY

1. **Personal Protective Equipment (PPE)**
    - Provide and enforce the use of appropriate PPE, including gloves, masks, boots, helmets, safety goggles, and chemical-resistant clothing.

2. **Safety Training and Awareness**
    - Regularly train staff on health and safety protocols, including:
        - Safe handling of chemicals.
        - Emergency response procedures.
        - Use of safety equipment and machinery.

3. **Hazard Communication**
    - Display safety signs and instructions clearly around the plant.
    - Label all chemicals and storage areas with appropriate hazard warnings.

4. **Confined Space Safety**

- Conduct gas testing for oxygen levels and toxic gases before entry.
- Use harnesses, lifelines, and ventilation systems for confined space work.
- Maintain a permit-to-work system for all confined space operations.

5. **Chemical Safety**
   - Store chemicals in designated, ventilated, and secure areas.
   - Use secondary containment to prevent spills.
   - Provide Material Safety Data Sheets (MSDS) for all chemicals.

6. **Operational Safety**
   - Regularly inspect and maintain equipment to prevent mechanical failures.
   - Implement lockout/tagout (LOTO) procedures for equipment under maintenance.

7. **Emergency Preparedness**
   - Install safety showers, eyewash stations, and first aid kits.
   - Develop and practice emergency response plans for:
     - Chemical spills.
     - Fire outbreaks.
     - Gas leaks.
   - Ensure availability of fire extinguishers and alarms.

8. **Hygiene Practices**
   - Encourage handwashing after handling sewage or chemicals.
   - Provide clean drinking water and washing facilities for employees.
   - Conduct regular health check-ups for staff.

9. **Monitoring and Audits**
   - Continuously monitor air quality in high-risk areas.

- Conduct periodic safety audits and inspections to identify and address risks.

Health and Safety Regulations and Standards

1. **Occupational Health and Safety Standards**
   - Compliance with local labor laws and international standards like ISO 45001:2018 (Occupational Health and Safety Management Systems).

2. **Environmental and Wastewater Regulations**
   - Adherence to guidelines issued by pollution control boards and environmental authorities for safe wastewater treatment.

3. **Incident Reporting**
   - Maintain records of all accidents, near-misses, and corrective actions taken.

Benefits of Prioritizing Health and Safety

- **Reduced Risks**: Minimizes workplace injuries, illnesses, and fatalities.
- **Increased Productivity**: Healthy and motivated staff contribute to efficient operations.
- **Regulatory Compliance**: Avoids penalties and legal issues.
- **Enhanced Reputation**: Demonstrates commitment to employee well-being and environmental responsibility

Precautions shall be taken by the Operator to ensure the health and safety of his staff and labour. The Operator shall, in collaboration with and to the requirements of the local health authorities, ensure that medical staff, first aid facilities and sick bay service are available at all

times, and suitable arrangements are made for all necessary welfare and hygiene requirements and for the prevention of epidemics. The employees shall be vaccinated for Typhoid, Hepatitis A & B, T Tect., regularly as per the prescribed dosage and intervals. The Operator shall maintain such records and made such reports (if any) concerning health, safety and welfare of persons and damage to the property as are required under the applicable Laws.

The Operator shall appoint a member of his staff at the site to be responsible for maintaining the safety and protection against accidents of personnel on the site. This person shall be qualified for his work and shall have the authority to issue instructions and take protective measures to prevent accidents. The Operator shall send to the Bangalore Water Supply and Sewerage Board's representative details of any accident as soon as possible after its occurrence.

38. PRIVATE OPERATOR'S PERSONNEL

The Bangalore Water Supply And Sewerage Board's representative may require the Operator to remove (or cause to be removed) any person employed on the site, including the Operator's representative, who in the opinion of the Bangalore Water Supply And Sewerage Board's representative persists in any conduct which prejudicial to safety, health or the protection of the environment. If appropriate, the Operator shall then appoint a suitable replacement person.

39. DISORDERLY CONDUCT

Disorderly conduct in the context of a Sewage Treatment Plant (STP) during operation and maintenance refers to inappropriate, disruptive, or unsafe behavior by personnel, contractors, or visitors that can affect the safety, efficiency, and compliance of plant operations. Addressing such

behavior is critical to maintaining a professional and secure work environment.

Examples of Disorderly Conduct in STP Operations

1. **Workplace Misconduct**
    - Harassment, verbal abuse, or physical altercations among staff.
    - Unprofessional behavior disrupting workflows or team dynamics.

2. **Substance Abuse**
    - Reporting to work under the influence of alcohol or drugs.
    - Possession or use of illegal substances on-site.

3. **Negligence or Recklessness**
    - Ignoring safety protocols, such as failure to wear PPE or improper handling of equipment.
    - Unauthorized access to restricted areas, posing safety risks.

4. **Theft or Vandalism**
    - Theft of tools, equipment, or plant resources.
    - Intentional damage to plant property or equipment.

5. **Non-Compliance with Rules**
    - Refusal to follow instructions from supervisors or adhere to standard operating procedures (SOPs).
    - Deliberate violation of environmental regulations or workplace policies.

6. **Disruptive Activities**
    - Unnecessary loud noise, horseplay, or distracting others from their duties.
    - Organizing unauthorized gatherings or protests on-site.

Impact of Disorderly Conduct

1. **Safety Risks**
    - Endangers the individual involved and others working in the plant.
    - Increases the likelihood of accidents and equipment damage.

2. **Operational Disruptions**
    - Delays in maintenance schedules and treatment processes.
    - Reduced productivity and morale among employees.

3. **Legal and Financial Repercussions**
    - Violations of safety and environmental regulations can lead to penalties or lawsuits.
    - Increased costs due to repairs, downtime, or legal settlements.

4. **Reputation Damage**
    - A poorly managed workforce reflects negatively on the operator’s professionalism and reliability.

Measures to Address Disorderly Conduct

1. **Policy Implementation**
    - Develop and enforce a **Code of Conduct** specifying acceptable and unacceptable behaviors.
    - Clearly outline consequences for disorderly conduct, including warnings, suspension, or termination.

2. **Employee Training**
    - Conduct regular training sessions on workplace ethics, safety, and professionalism.

- Emphasize the importance of teamwork, respect, and compliance with SOPs.

3. **Grievance Redressal Mechanism**
   - Establish a system for employees to report grievances or incidents of misconduct.
   - Ensure confidentiality and impartial investigation of complaints.

4. **Supervision and Monitoring**
   - Appoint supervisors to oversee employee behavior and compliance with rules.
   - Use CCTV and other monitoring tools to deter and detect misconduct.

5. **Disciplinary Actions**
   - Implement a progressive disciplinary system:
     - **First Offense**: Verbal warning and documentation.
     - **Second Offense**: Written warning and counseling.
     - **Repeated Offense**: Suspension or termination, depending on severity.
   - In cases of criminal behavior, involve law enforcement if necessary.

6. **Substance Abuse Policy**
   - Conduct random drug and alcohol testing as permitted by law.
   - Provide counseling or rehabilitation programs for employees with substance abuse issues.

Steps for Handling Disorderly Conduct

1. **Identify the Issue**
   - Observe or receive reports of inappropriate behavior.

    - Document incidents with details such as date, time, location, and witnesses.

2. **Investigate the Incident**
    - Conduct a fair and thorough investigation involving all relevant parties.
    - Gather evidence, such as CCTV footage or witness statements.

3. **Take Immediate Action**
    - For severe misconduct, suspend the individual pending investigation.
    - For minor issues, provide counseling or warnings.

4. **Communicate Outcomes**
    - Inform the individual of the investigation's findings and the consequences.
    - Reinforce the importance of adhering to workplace rules.

5. **Prevent Recurrence**
    - Review policies and training programs to address gaps that led to the incident.
    - Encourage a culture of accountability and mutual respect.

Preventive Measures to Avoid Disorderly Conduct

- Foster a positive workplace culture emphasizing respect, communication, and teamwork.
- Recognize and reward exemplary behavior and contributions.
- Conduct regular reviews of workplace policies and update them to reflect current challenges.

The Operator shall at all times take all reasonable precautions to prevent any unlawful, riotous or disorderly conduct by or amongst his staff and

labour and to preserve peace and protection of persons and property in the neighborhood of the site against such conduct.

40. ELIMINATION OF CHILD LABOUR

Child labor is a serious ethical, legal, and social issue that must be strictly avoided in all aspects of the operation and maintenance of Sewage Treatment Plants (STP). Ensuring compliance with laws prohibiting child labor reflects an organization's commitment to human rights, social responsibility, and sustainable development.

Key Principles of Child Labour Elimination

1. **Legal Compliance**
    - Adhere to national and international labor laws, such as:
        - **The International Labour Organization (ILO) Convention No. 138** (Minimum Age) and No. 182 (Worst Forms of Child Labour).
        - Local laws, such as the **Child Labour (Prohibition and Regulation) Act, 1986**, in India, or equivalent legislation in other countries.

2. **Minimum Age Requirement**
    - Ensure no individual below the legal minimum working age (usually 18 for hazardous work) is employed in STP operations.

3. **Prohibition of Hazardous Work for Minors**
    - Prevent individuals below 18 years from engaging in hazardous tasks such as handling sewage, operating heavy machinery, or working with toxic chemicals.

Actions in Case of Child Labour Incidents

1. **Immediate Removal**
    - Safely and humanely remove the child from the work environment without harm or penalty.

2. **Rehabilitation Support**
    - Collaborate with local authorities, NGOs, or child welfare organizations to provide education, training, or alternative livelihood options for the affected child and their family.

3. **Legal Reporting**
    - Inform labor authorities or regulatory bodies to comply with legal requirements.

4. **Policy Review**
    - Identify gaps in hiring or compliance processes that led to the incident.
    - Implement stricter checks to prevent recurrence.

a) Attention of Operators are invited to the Child Labour (Prohibition and Regulations) Act 1986, which prohibits employment of children below 14 years of age in certain occupation and process and provides for regulation of employment of children in all other occupations and progress. Employment of child labour is prohibited in Building and Construction industry.

b) Hence, all the Operators are requested to adhere to the provisions in the above Act and see that engagement of child labourers in the operational activities of the Board are completely eliminated. Any violation of the provisions will lead to penal action apart from removing the name of the Operators from the list of registered Operators.

49. HOUSE KEEPING:

Key Aspects of Housekeeping in STP Operations

1. **Cleanliness of Work Areas**
    - Regularly clean floors, platforms, and walkways to prevent accumulation of dirt, grease, or sewage.
    - Ensure that all workstations and operating areas are free from unnecessary tools or materials.

2. **Spill Management**
    - Address spills immediately using absorbents or cleaning agents.
    - Keep spill kits readily available in areas where chemicals or oil are used.

3. **Storage Practices**
    - Store chemicals, tools, and spare parts in designated areas with proper labeling.
    - Use racks, cabinets, or bins to avoid clutter and ensure easy access.

4. **Waste Management**
    - Segregate and dispose of solid, liquid, and hazardous waste according to prescribed protocols.
    - Ensure sludge is handled and stored in a manner that prevents odor, leaks, and contamination.

5. **Ventilation and Drainage**
    - Maintain proper ventilation in all areas to reduce foul odors and improve air quality.
    - Keep drainage systems clear of blockages to prevent water stagnation or overflow.

6. **Lighting and Visibility**
    - Ensure all areas, including confined spaces and walkways, are well-lit.
    - Regularly clean light fixtures to maintain their efficiency.

7. **Pest Control**
    - Implement pest control measures to prevent infestations, which can compromise hygiene and safety.
    - Regularly inspect for rodents, insects, or birds in the plant premises.

Housekeeping Procedures

1. **Daily Activities**
    - Sweep and mop floors.
    - Check and clean equipment surfaces.
    - Empty waste bins and dispose of trash properly.

2. **Weekly Activities**
    - Deep clean tanks, pipelines, and machinery exteriors.
    - Inspect and clean storage areas for tools and chemicals.
    - Wash PPE and ensure its availability.

3. **Monthly Activities**
    - Perform comprehensive cleaning of confined spaces (if necessary).
    - Clean vents, exhaust systems, and other hard-to-reach areas.
    - Review and restock cleaning supplies and safety equipment.

Tools and Equipment for Housekeeping

- **Cleaning Tools**: Brooms, mops, dusters, and scrubbers.
- **Safety Equipment**: Gloves, masks, safety goggles, and boots.

- **Waste Management**: Segregated bins, sludge containers, and spill kits.
- **Cleaning Agents**: Biodegradable detergents, disinfectants, and degreasers.

Training and Awareness

- Train staff on housekeeping protocols and the importance of maintaining cleanliness.
- Conduct regular refresher courses to reinforce proper practices.
- Display signage with housekeeping rules and reminders at key locations.

Monitoring and Audits

1. **Inspections**: Perform regular housekeeping inspections to identify and address issues promptly.
2. **Checklists**: Use housekeeping checklists to ensure all tasks are completed systematically.
3. **Feedback System**: Encourage employees to report areas requiring attention or improvement.

Benefits of Effective Housekeeping

1. **Enhanced Safety**: Reduces accidents and injuries.
2. **Operational Efficiency**: Improves workflow and reduces downtime.
3. **Regulatory Compliance**: Meets health, safety, and environmental standards.
4. **Employee Morale**: Creates a comfortable and professional work environment.

The operator shall keep the treatment plant clean and tidy so that it is good appearance at all times. To this end

- all buildings and surrounding \s shall be kept neat, clean and tidy without dust, cobwebs etc.,
- the floors of all walkways, stairs, offices, toilets, panel board rooms, the laboratory and other areas inside the buildings are to be brushed and washed every day,
- windows and doors are to be washed at least once in a week,
- brass and other metal surfaces are to be polished at least once in a week,
- the process and storage tanks are to be emptied, cleaned and disinfected with bleaching powder as required for efficiency, in accordance with the O & M manual, at least once in every six months,
- shall inform his personnel and shall enforce high standards of hygiene,
- landscaped areas between and buildings shall be properly tended so that the grass, shrubs and trees are kept in a healthy condition,
- shall remove all unwanted growth of vegetation in the treatment plant area,
- Shall remove all screenings, silt, sand and other waste materials from the treatment plant area.

52. THE OPERATOR’S STAFF AND LABOUR:

52.1 Engagement of staff and labour:

The Operator is entirely responsible for the staffing of the treatment plant and for the adequacy of his staff, in terms of capability and numbers, to operate and maintain treatment plant in accordance with the

requirements of the contract to the satisfaction of the Owner’s Representative.

The Operator shall make all arrangements for the engagement of the management personnel, skilled and unskilled labour required operating and maintaining the treatment plant. The Operator’s monthly rate is deemed to include for all the costs associated with their employment including their payments, social and statutory costs, their welfare, housing, transport, overheads and profit etc,. Other than accommodation arranged with BWSSB, the Operator shall not allow any of his employees to maintain any temporary or permanent quarters within the treatment plant or within BWSSB’s premises.

If, during the course of the contract, the Owner’s Representative is of the opinion that the Operator is not fulfilling his obligations, with respect to the operation and/ or maintenance of the treatment plant to his satisfaction, he will inform the Operator accordingly in writing. The Operator shall submit his proposals for rectification to the Owner’s Representative for his approval. If it is necessary for the Operator to modify his staff and/ or labor arrangements, the Operator shall do so immediately at his own expense.

52.2 Qualifications:

The Operator shall employ only persons who are careful and appropriately qualified, skilled and experienced in their respective professions, trade or occupations.

Plant Manager of the STP -Graduate/Post Graduate in Civil, Public Health, or Environmental Engineering with 5yrs experience in UWTP with SBR Technology.

52.3 Conditions of Labour:

The Operator shall pay rates of wages and observe conditions of labour, not less favourable than those established for the trade or industry where the work is being carried out.

The Operator shall comply with all the relevant labour laws relating to his employees, and shall duly pay and afford to them all their legal rights. The Operator shall require all such employees to obey all applicable laws and regulations concerning safety at work.

52.4 Operator’s Personnel to remain unchanged:

After receiving the Owner’s Representative’s instruction to proceed, and prior to mobilization, the Operator shall update and confirm to the Owner’s Representative the organization chart, submitted with his tender, together with CVs and qualification certificates of any key personnel who have been changed from those in the Operator’s tender. Such changes, if any, shall be subject to the approval of the Owner’s Representative.

Expect as the Owner’s representative may otherwise agree, the Operator’s staff and skilled labour/ Semi Skilled and labour shall remain unchanged from those mobilized at the commencement of the contract. If, during the course of the contract, any of these staff and skilled labour/Semi Skilled resigns or becomes incapacitated or is withdrawn, with the permission of the Owner’s Representative, or is discharged, the Operator shall nominate a replacement candidate with at least equivalent qualifications and experience for the approval of the Owner’s representative. The Operator shall bear the costs of such replacements.

Similarly, the Operator shall replace any of his personnel who is found by the Owner’s Representative to be unqualified, incompetent or otherwise becomes undesirable. In such circumstances, the Owner’s Representative will notify the Operator at the site in writingin the log book and the Operator shall suspend the person immediately and exclude him from the site and from BWSSB’s premises. If required by the Owner’s Representative, the Operator shall provide a replacement as soon as possible.

52.5 Mobilization of staff and labour:

Before any of the Operator’s management personnel and skilled and un skilledlabour commence their duties at the treatment plant, the Operator shall submit for all his personnel, management staff, skilled and unskilled labour

- qualification certificates, experience certificates.
- medical fitness certificates, certifying that they are in good general health,
- passport size photographs affixing their signature.

52.6 Each of the Operator’s employees will be provided with an Identity Card (with Photograph) signed by Operator and Owner’s Representative. These cards shall be worn at all times while the Operator’s employees are on site.

52.7 Staff and labour returns:

The Operator shall submit detailed daily returns showing the staff and the skilled labour and the numbers of the several classes of the unskilled labour employed by the Operator. The returns shall be in such form and submitted at intervals as the Owner’s Representative may prescribe.

52.8 Uniforms:

The Operator personnel shall wear uniforms, distinguishable from BWSSB’s uniform but otherwise of the Operator’s choice, with ankle black shoes/ safety shoes/ gum boots, hand gloves, safety equipments wherever required.

53. THE LABORATORY:

The laboratory within a Sewage Treatment Plant (STP) plays a critical role in ensuring that the treatment processes are functioning properly and that the plant complies with environmental regulations. Regular testing of

influent, effluent, and sludge quality, as well as the monitoring of various parameters, is essential for maintaining operational efficiency and meeting discharge standards.

Key Roles and Functions of the Laboratory in STP

1. **Monitoring Water Quality**
    - Regularly test influent, effluent, and treated water to ensure that the treatment process is working effectively.
    - Measure key parameters, including:
        - **Biochemical Oxygen Demand (BOD)**
        - **Chemical Oxygen Demand (COD)**
        - **Total Suspended Solids (TSS)**
        - **pH**
        - **Nutrients (nitrogen, phosphorus)**
        - **Turbidity**
        - **Heavy Metals**
        - **Coliform and pathogens**

2. **Process Control and Optimization**
    - Provide data that informs the adjustment of operational parameters (e.g., aeration rates, chemical dosing).
    - Assist in optimizing chemical treatment processes, like coagulant and flocculant dosing.

3. **Sludge Analysis**
    - Regularly monitor the characteristics of sludge, such as solids content, settling behavior, and stability.
    - Ensure proper handling, treatment, and disposal of sludge in compliance with regulatory standards.

4. **Compliance Testing**

- Ensure that treated effluent meets local and international discharge standards.
- Prepare reports for regulatory authorities detailing water quality and treatment performance.

5. **Support for Maintenance and Troubleshooting**
   - Assist the maintenance team by identifying issues related to plant operations (e.g., biological treatment failure or chemical imbalances) through lab analysis.
   - Support troubleshooting efforts by analyzing samples from equipment or processes showing irregularities.

6. **Environmental and Health Safety Monitoring**
   - Conduct tests on air, water, and soil around the plant to ensure the facility is not causing environmental pollution.
   - Test for contaminants or pathogens that could pose a risk to public health or the environment.

Types of Laboratory Tests in STP Operations

1. **Physical Tests**
   - **Turbidity**: Measures the cloudiness of water, indicating the presence of suspended particles.
   - **Temperature**: Influences chemical and biological treatment processes.

2. **Chemical Tests**
   - **BOD and COD**: Indicators of organic material in wastewater and effluent.
   - **pH Levels**: Essential for maintaining optimal conditions for biological processes.
   - **Nutrient Concentrations**: Nitrogen and phosphorus levels that impact eutrophication.

- **Heavy Metals**: Test for contaminants such as lead, mercury, and arsenic.
- **Residual Chlorine**: Measures the chlorine concentration in treated water, important for disinfection.

3. **Biological Tests**
   - **Coliform and E. coli**: Indicators of microbial contamination.
   - **Microscopic Examination**: To observe microbial activity and efficiency in biological treatment (e.g., sludge age or health of microbial colonies).

4. **Sludge Analysis**
   - **Total Solids**: Measures the concentration of solid material in the sludge.
   - **Volatile Solids**: Indicates the amount of biodegradable material in the sludge.
   - **Sludge Settling Tests**: Assess the efficiency of solids removal during sedimentation.

Key Laboratory Equipment in STP

1. **Spectrophotometer**: For measuring concentration of chemicals and pollutants, such as BOD, COD, and nutrients.
2. **Turbidity Meter**: Measures the turbidity (cloudiness) of water.
3. **pH Meter**: For monitoring and adjusting the pH of wastewater and sludge.
4. **Incubator**: Used for growing bacterial cultures for BOD and microbiological testing.
5. **Filtration Equipment**: For separating solids from liquids for TSS and other solids-based tests.
6. **Chemical Reagents**: For conducting various chemical analysis such as COD, chlorine residual, and heavy metals.

Laboratory Management and Operations

1. **Qualified Personnel**
    - Ensure laboratory staff are well-trained in handling testing procedures, calibration of instruments, and interpreting results.
    - Maintain certifications for staff who handle hazardous chemicals or biological samples.

2. **Sample Collection and Handling**
    - Follow strict protocols for sample collection, preservation, and transportation to ensure accurate results.
    - Establish clear guidelines for handling and disposal of hazardous materials.

3. **Data Recording and Reporting**
    - Maintain accurate and up-to-date records of all tests, results, and analyses.
    - Generate regular reports for internal stakeholders, regulators, and clients on plant performance and compliance.

4. **Quality Assurance and Calibration**
    - Regularly calibrate laboratory equipment and perform quality control checks to ensure data accuracy.
    - Participate in external proficiency testing programs to maintain laboratory accreditation.

Safety Considerations in the Laboratory

1. **Personal Protective Equipment (PPE)**
    - Provide laboratory personnel with PPE such as gloves, goggles, lab coats, and face shields to handle hazardous substances safely.

2. **Chemical Handling and Storage**
    - Store chemicals according to manufacturer guidelines and local regulations.
    - Label chemicals clearly and ensure Material Safety Data Sheets (MSDS) are available.

3. **Waste Disposal**
    - Follow proper procedures for the disposal of chemical and biological waste.
    - Ensure that waste is treated or neutralized before disposal to prevent environmental contamination.

The Operator shall operate and maintain the laboratory under the guidance of the BWSSB's Chemist and Owner's Representative. The sampling system shall be prepared and the Owner should approve it. Daily composite samples have to be taken and analysis has to be carried out. The laboratory has been provided with equipment required to determine the results of parameters mentioned earlier. The Operator shall maintain and operate these equipment for regular analysis. The reagents required for the operation has to be supplied by the Operator.

The Operator shall provide a qualified graduate chemist. Records of the sampling, testing, analysis shall be maintained and submitted to the Owner's Representative daily. These records shall be consolidated monthly into a report to the Representative with the Operator's observations on performance and compliance.

54. DEFAULT OF THE OPERATOR:

54.1 Notice to correct:

If the Operator fails to carry out any of his obligations in accordance with the contract, the Owner's Representative may give notice to the Operator requiring him to make good such failure and remedy the same within a specified reasonable time.

54.2 Termination:

The Owner may, after having given 14 days' notice to the Operator, terminate the Operator's employment under the contract and expel him from the treatment plant. The Operator shall then deliver all the records, manuals, and procedure documents etc., made by him to the Owner's Representative. The Operator shall not be released from any of his obligations or liabilities under the contract. The rights and authorities conferred on the Owner and the Owner's Representative by the contract shall not be affected.

The Owner may upon such termination operate and maintain the treatment plant himself and/ or by any other contractor. The Owner or other contractor may use the records, manuals, procedure, documents etc., made by the Operator, together with spares, equipment, tools, consumables etc., purchased by the Operator during the contract, as he or they think proper.

54.3 Valuation at date of Termination:

The Owner's representative shall, as soon as possible after termination, determine and advise the Operator of all sums then due to the Operator as the date of termination. This shall include the value of the spares, equipment, tools, and consumables etc., purchased by the Operator during the contract, at the date of termination after giving credit to the Owner for the amounts deemed by the Owner's Representative in respect of these items.

54.4 Payment after termination:

After termination, the Owner shall not be liable to make any further payments to the Operator until all the costs incurred by the Owner in replenishing the stocks of spares and tools etc., the costs of remedying defects and the completion of outstanding work, in accordance with the conditions of the contract.

The Owner shall be entitled to recover from the Operator the extra costs, if any, of operating and maintaining the treatment plant for the remainder contract period after allowing for any sums due to the Operator. If there are no such extra costs, the owner shall pay any balance to the Operator.

55. BRIBES:

If the Operator, or any of his agents or servants gives or offers to give to any person any bribe, gift, gratuity or commission as an inducement or reward:

- for doing or forbearing to do any action in relation to the contract or to any other contract with the Owner or
- for doing or forbearing to show favour or disfavour to any person in relation to the contract or to any other contract with the Owner,

then the Owner may, after having given 14 days' notice to the Operator, terminate the Operator's employment under the contract and expel him from the site and the provisions above shall apply as if such termination had been made in accordance with this clause.

TECHNICAL SPECIFICATIONS

i) Electrical and Mechanical works:

The Operator may carryout all the Electrical and Mechanical repair works required for the purpose of uninterrupted treatment of the wastewater.

Pumping Machinery and Electrical works – General

- **Daily Tasks**:
    - Inspect pumps, blowers, and decanters for unusual noise or vibrations.
    - Check and clean diffusers for clogging.
- **Weekly Tasks**:
    - Measure and record DO, MLSS, and pH levels.
    - Backwash screens and clear debris.
- **Monthly Tasks**:
    - Lubricate motors and inspect cable terminations.
    - Calibrate instruments (flowmeters, sensors).

3.2. Spare Parts Inventory

- Stock critical spares:
    - Bearings, seals, motor windings, and electronic modules.
    - Diffuser membranes and pump impellers.

3.3. Safety Protocols

- **Electrical Safety**:
    - Implement lock-out/tag-out (LOTO) procedures.
    - Use insulated tools and wear PPE during repairs.
- **Mechanical Safety**:
    - Install guards on rotating equipment.
    - Provide emergency stop buttons near high-risk equipment.

3.4. Training and Documentation

- Train operators on SCADA usage and emergency protocols.

- Maintain logbooks for process parameters, maintenance, and spare parts usage.

a) All the materials used shall confirm to the relevant I. S. I. wherever applicable. The make and other details of the materials proposed to be used should be furnished along with the tender. Only approved make has to be used in the case of replacement of materials.
b) Continuous earth connection has to be ensured.(**Earthing**: Double earthing with resistance <1 ohm, Dedicated earthing system for sensitive instruments and panels.)
c) The wiring and cabling work should be done as per I E rules.
d) Any damages or breakages, chipping etc., caused during execution of the work shall be rectified by the Operator at his cost to the satisfaction of the Owner's Representative – in – charge.
e) The Operator has to test each and every point after the completion of the repair work to the entire satisfaction of the Owner's Representative – in – charge.
f) The Operator is responsible for the safe custody of all the materials and equipments under this contract till handing over to Board.
g) All necessary civil works required for the erection/ repair of all equipments and accessories under this contract should be done by the Operator at his cost.
h) Test certificates for machinery and equipments should be produced regularly along with supply
i) The Operator should maintain one set of Tools for the maintenance of the machinery and equipments supplied by them under this contract.

ii) Mandatory duties of the Operator

1. The Operator is responsible for the procurement and for testing and maintenance of supplies of all goods and services necessary to

ensure compliance with the Operator’s obligation under this contract.

2. Operator should provide manpower required for the operation and maintenance of the wastewater treatment plant. The treatment plant means the entire plant consisting of various units required/ constructed for the purpose of treatment of wastewater. It is the responsibility of the Operator to provide necessary supervisory staff and security staff to prevent entry of unauthorized persons.
3. The treatment plant has to be operated round the clock in three shifts of 8 hours each throughout the year without any break. The plant has to be operated according to the availability of incoming wastewater and has to be increased or decreased at any point of time as directed by Owner’s Representative – in – charge. The Operator has to maintain all the units in good working condition free from objectionable odour.
4. Minor and major repairs to equipment involved in the contract have to be carried out by the Operator during the O & M period of 5 years. Any repairs to the pipe lines inside the plant premises has to be attended by the Operator during O & M period. If any expert opinion or services is required for carrying out the Major or Minor repairs, the same may be called and work may be carried out without any additional cost or no cost to the Board.
5. On completion of the maintenance period, the treatment plant has to be handed over to the Board in good running condition. At the time of taking over by the Board all the equipment and accessories in the treatment plant will be inspected and if any defects are noticed, the same will have to be rectified to the original running condition only after which the unit will be taken over.
6. The Operator should ensure that backup teams would be available to operate the plant and equipment continuously.
7. The Operator has to operate and maintain the plant as recommended in the manual with proper logs and records of the work carried out.

8. The Operator has to properly maintain all the valves.
9. The Operator has to operate and maintain Capacitor and allied switchgear to maintain power factor not less than 0.90 lag or as prescribed by BESCOM. Power factor Penalty if any levied by BESCOM has to be borne by the Operatorand if any additional charge/The surcharges penalty levied by BESCOM due to failure to maintain power factor above 0.9 lag the penalty has to be borne by the contractor.
10. The Operator has to keep and maintain all units of the treatment plant and its surroundings neat, clean and tidy and in an aesthetic manner.
11. The Operator has to maintain the garden developed in and around the plant premises and also has to develop the garden further wherever it is possible.
12. Inspection registers and other registers should be maintained and to be made available to the inspecting officer of the Board.
13. Mandatory regulations prescribed by the Government shall be followed by the Operator without any lapse, including those conditions amended by those departments periodically.
14. The Operator should enclose the list of staff to be employed with qualification certificate, experience certificate and their passport size photograph affixing their signature.
15. The Operator should provide uniform, identification badges to all the staff and they should wear during working hours.
16. Tools and tackles for the operation and maintenance should be provided by the Operator.
17. Any equipment, tools and plants supplied by the Board should be kept in good working condition and these should not be taken out of the premises without the written permission of the Owner’s Representative – in – charge.
18. The Operator shall provide a Notice board detailing precautions to be taken by operation personnel in work conformity with Industries and labour regulations.

19. The materials should be properly stocked for easy verification and easily accessible for receiving and storing the fresh stock whenever they are supplied at site.
20. Printing of registers, log sheets and stationery required for the maintenance of the records has to be arranged by the Operator at his cost.
21. The Operator has to maintain basic cost records for all the direct and indirect expenditure and overheads on regular basis as prescribed by Owner's Representative – in – charge.
22. It is the responsibility of the Operator to liaison with BESCOM for attending fuse – off calls and other related complaints. Also, the relative cost charged by BESCOM has to be borne by the Operator and should obtain the monthly BESCOM bill and same has to furnish division office/sub division office within 3rd of every month. If there are any changes in the BESCOM bill in the opinion of the BWSSB's engineer, the operator has to visit to concerned BESCOM office get required changes from concerned BESCOM AEE office and should submit revised bill copy to BWSSB AEE sub-division office/division office within 5th of every month.
23. The Operator shall make payments to the employees as per the relevant statutory requirements and should obtain required license as per the statutory requirements laid down by Central/ State Government.

iii) Minor and Major Repairs:

The word Minor repair means all Electrical and Mechanical repairs, replacement of spares such as bearings, electrical spares carried out in the plant for the continuous operation of the plant round the clock without break down for not more than 1 Hour of any equipment.

The word Major repair means all repair works carried out to Mechanical and Electrical equipments.

The minor and major repair doesn't include the item of works, which exceeds more than Rs. 5,00,000/- in each item of work. The cost is inclusive of material cost and labour cost. The rate analysis for carrying out the repairs costing more than Rs. 5,00,000/- has to be prepared and submitted to the Owner for approval.

iv) List of works to be carried out:

a) Operation and removal of screenings in the Course and fine screens and disposing the same as per the BBMP SWM Rules 2016.
b) Operation of Degritting Unit and Classifier and removal of grit from the pit and transporting the same and disposing the same in an environment friendly manner and as per the BBMP SWM Rules 2016.
e) TSPS:
    I. Operation of Pumps.
    II. Maintenance of Electrical and Mechanical equipment such as cleaning the panel board, replacement of electrical spares, lubrication of all the mechanical equipment, replacements of all necessary mechanical spares.
    III. House keeping.
    IV. Operation of Suction and Delivery side valves.
    V. Removal of any blockage in the pipeline.
f) SBR
    I. Operation of diffuser system/ blowers, RAS & WAS Pumps, Decanters

    II. Maintenance of all electrical equipment

g) Sludge Pump House, Thickener, Centrifuge:
    I. Operation of Pumps, Thickener, Centrifuge.
    II. Disposal of sludge at a designated area/location provided by BWSSB or as per the instructions of BWSSB.
    III. Maintenance of Electrical and Mechanical equipment such as cleaning the panel board, replacement of electrical spares,

lubrication of all the mechanical equipment, replacements of all necessary mechanical spares.

IV. House keeping.

V. Operation of Suction and Delivery side valves.

VI. Removal of any blockage in the pipeline.

h) Disc Filter Unit & CCT Operation

I. Operation of Disc Filter system

II. Cleaning of Disc Filter and CCT tank

III. Maintenance of all electrical and mechanical equipment

i) Outfall Structure:

I. Cleaning of the Outfall Structure.

II. Deposition of any wanted material in the channel has to be removed.

j) Alum Dosing System Operation

k) Transformer Yard:

I. Cleaning of the Transformer yard.

II. Removal of weed growth.

l) House Keeping of all the structures.

m) Maintenance of Garden and Landscape.

n) Maintenance of approach roads.

o) Maintenance of Streetlights.

p) Inspection of all electrical equipment which are to be carried out and certified by Electrical Inspectorate as per Rules by paying necessary feesincluding Electrical inspectorate compliance report charges & annual maintenance of DG set certification & calibration report from first class Electrical contractor. The valid certificates are to be displayed at important locations.

q) Providing skilled staff as per Rules laid down by the Government

FORMATS

Format – I

EXPERIENCE CERTIFICATE FOR OPERATION AND MAINTENANCE OF INTERMEDIATE SEWAGE PUMPING STATION (ISPS)

This is to certify that ..... have under taken operation and maintenance of Intermediate Sewage Pumping Station of capacity ..... MLD at ..... from ..... To ..... . The performance of the above Operator in carrying out the operation and maintenance of the above ISPS is satisfactory.

Signature with designation.

Name:

Company's name and address:

Note: This certificate has to be signed by the officer in the rank of Chief Engineer or General Manger or the Works Manger of the organization.

Format - II

HANDING / TAKING OVER OF ASSETS

Inspection carried out on .....

Handed over on .....

Signature of Board Owner's Representative ..... Name: .....

Signature of the Operator ..... Name: .....

Format - III

CONDITION SHEDULE OF ASSESTS AT HAND OVER

(use separate sheet for each unit)

Name of the unit:

Name of the equipment	Operational	Observed defects	Comments

Preventive maintenance Schedule

Operator should adopt a preventive maintenance schedule for avoiding breakdowns. These preventive maintenance methods include but not limited to the following:

Daily Maintenance Tasks

1. **Inspection**
    - Check the influent and effluent water quality (pH, BOD, COD, TSS levels).
    - Inspect pumps, blowers, and motors for abnormal noise or vibrations.
    - Monitor flow meters, pressure gauges, and temperature indicators.
2. **Cleaning**
    - Remove debris from screens and grit chambers.
    - Clean the surface of clarifiers to prevent scum buildup.
3. **Operational Checks**

- Ensure all control panels and sensors are functioning properly.
- Verify the proper operation of aeration systems and diffusers.

Weekly Maintenance Tasks

1. **Lubrication**
   - Lubricate bearings and moving parts of pumps, blowers, and motors as per the manufacturer's recommendations.
2. **Inspection**
   - Inspect the condition of tanks, valves, and pipelines for leaks or corrosion.
   - Verify the operation of chemical dosing systems.
3. **Cleaning**
   - Clean aeration tanks and sludge handling areas if required.
   - Backwash filters if installed.

Monthly Maintenance Tasks

1. **Mechanical Components**
   - Check the alignment of pumps and motors.
   - Inspect and tighten bolts and nuts on mechanical assemblies.
2. **Electrical Components**
   - Inspect electrical panels for loose connections or signs of wear.
   - Test standby generators and UPS systems.
3. **Chemical Systems**
   - Calibrate chemical dosing pumps.
   - Refill chemical storage tanks.

Quarterly Maintenance Tasks

1. **Equipment Overhaul**
    - Inspect and service blowers, pumps, and compressors.
    - Replace worn-out parts such as seals and gaskets.
2. **Instrumentation**
    - Calibrate flow meters, pH meters, and other monitoring instruments.
    - Verify the accuracy of SCADA.
3. **Sludge Management**
    - Measure and remove excess sludge from digesters or clarifiers.

Annual Maintenance Tasks

1. **Comprehensive Inspection**
    - Conduct a thorough inspection of all mechanical, electrical, and civil structures.
    - Inspect aeration systems, including diffusers and blowers.
2. **Major Servicing**
    - Service or replace worn-out bearings, impellers, or other critical components.
    - Descale and clean heat exchangers (if applicable).
3. **Performance Testing**
    - Conduct a full performance audit, including effluent quality tests.
    - Evaluate the efficiency of the treatment process and make necessary adjustments.

Additional Recommendations

1. **Maintain Records**
    - Log all maintenance activities, inspection results, and equipment performance data.

- Use a Computerized Maintenance Management System (CMMS) for better tracking.

2. **Emergency Preparedness**
   - Train staff for emergency responses (e.g., power failure, equipment breakdowns).
   - Stock critical spare parts such as bearings, seals, and valves.
3. **Vendor Support**
   - Schedule periodic visits by OEM representatives for advanced diagnostics.

RESPONSIBILITIES OF OPERATOR

HOURLY

1) Checking wet well /TSPS levels and flow rates.
2) Sharing flow meter, energy meter, level meter, DG meter etc ..pictures /video with Geo Co-ordinates to BWSSB's engineer in charge of plant as per the instructions of the BWSSB's engineer in charge of the plant.
3) Loging/entering the flow meter, energy meter , level meter, DG meter etc ..data into log book as per the instructions of BWSSB's engineer in charge of plant. The logbook should be in the format as instructed by BWSSB's engineer in charge of plant.
4) Sharing of Houlry SCADA reports, Flow meter video/pics, and Energy meter video/pics with geo coordinates and time as per instructions of BWSSB engineer in charge.
5) Preparing Hourly reports as per the instructions of the BWSSB engineer in charge.
6) Updating consumable records in the plant as per the instructions of the BWSSB engineer in charge.
7) Maintaining records of Lab consumable records like chlorine/ sodium hypochlorite consumption, poly

consumption, diesel consumption, and power outage register as per the instructions of the BWSSB engineer in charge.

8) The operator has to Liaison with other regulatory/govt agencies as per the instructions of the BWSSB engineer in charge.
9) Sharing Pictures of O&M staff details including in time and out time as per shift schedule with Geo Coordinates during the start and close of every shift as per the instructions of BWSSB's engineer in charge plant.
10) Updating and Sharing the hourly flow meters/energy meters including DG meter totalizer details in the excel/any online drive links/forms etc as per the instructions of the BWSSB's engineer in charge of plant.

DAILY

1. Updating and Sharing the daily flow meters/energy meters including DG meter totalizer details in the excel/any online drive links/forms etc as per the instructions of the BWSSB's engineer in charge of the plant. Daily flow reading has to calculate by taking totalizer reading from midnight 12AM to 12AM i.e 24 hours.
2. Cleaning of the plant area .
3. Checking oil levels and tap up if necessary and greasing all the moving parts
4. Checking the vibrations in the pump sets, moving assemblies etc.,
5. Tightening the foundation bolts
6. Checking rise in temperature of bearings in motors, in moving parts and other units

7. Checking the functioning of gauges, electrical measuring units
8. Checking the leakages in the pipe line, pumps, water retaining structures
9. Checking the functioning of bridges, moving parts in the clarifiers
10. Checking the functioning of the transformers
11. Checking the functioning of the components in the panel boards
12. Measurement of current and voltage in all panel boards and recording the same in log book.
13. Maintaining the garden and other plants .
14. Measurement of energy meters, and flow meters, level meter reading in the logbook.
15. Sharing of Daily SCADA reports, Flow meter video/pics, and Energy meter video/pics with geo coordinates and time as per instructions of BWSSB engineer in charge.
16. Preparing reports as per the instructions of the BWSSB engineer in charge.
17. Maintaining records in the plant as per the instructions of the BWSSB engineer in charge.
18. Maintainingrecords of Lab consumable records like chlorine/ sodium hypochlorite consumption, poly consumption, diesel consumption, and power outage register as per the instructions of the BWSSB engineer in charge.
19. The operator has to Liaison with other regulatory/govt agenciesas per the instructions of the BWSSB engineer in charge.
20. The operator/plant manager has to visit /liaison with other regulatory/govt agencies offices as per the instructions of the BWSSB engineer in charge.

21. The operator/plant manager at the end of each shift including the general shift has to update the cumulative total flow of the plant,Number of present and absentees of O&M staff as per shift schedule, power consumption of the plant, diesel consumption, power outage, chemical consumption any major and minor repairs carried out,outlet parameters, inlet parameters etc to BWSS's engineer in charge of the plant.
22. The O&M staff of the operator including the plant manager has to adhere to the instructions given by the BWSSB's engineer in charge of the plant.
23. The plant manager has to prepare and share any reports/documents both online in soft copies and hard copies whenever required as per the instructions of BWSSB's engineer in charge.

WEEKLY

1) Tightening of all electrical connections
2) Checking the temperature difference due to loose connections
3) Watering electrical earth pits
4) Checking the functioning of all types of valves
5) Checking of the over load relays
6) checking of the single phase preventers
7) De-weeding of transformer yard
8) Submitting the weekly progress reports including power outage report, flow reports, chemical consumable reports, and lab analysis reports to BWSS's engineer in charge of the plant and after verification and signing of documents by concerned plant BWSSB AE/JE and AEE. The duly signed copies have to be submitted to the concerned BWSSB sub-divisionoffice of the plant.

9) Attending weekly review meeting along with all the necessary documents of plant regarding operation and maintenance of the plant as per the instructions of the BWSSB Engineer In charge.

MONTHLY

1) Changing of gland packing
2) Checking the indicators for wearing of parts
3) Checking of all electrical contacts
4) Checking the motor with megger
5) Meggering of all electrical equipments
6) Changing thetransformer load monthly between standby and working transformer.
7) Attending monthly review meeting along with all the necessary documents including monthly reports of plant ,regarding operation and maintenance of the plant as per the instructions of the BWSSB Engineer In charge.
8) The signed copies of the monthly reports from both BWSSB's concerned AE and AEE and the operator representative should be submitted to BWSSB division office by the fifth of each month.
9) The monthly reports include the following documents: a consolidated report, an internal lab report, a fortnightly NABL-accredited third-party testing report for inlet, outlet, and sludge samples, a QA inspection certificate, OCEMS report, a power outage report, a diesel consumption report, the monthly BESCOM bill, a functional guarantees report, a chemicals consumables report, and details of treated water sales provided through the BWSSB Jalasnehi portal. This list is not exhaustive; the operator must also provide any additional documentation as instructed by the BWSSB engineer in charge.

10) The plant manager/ instrumentation engineer of plant must visit BWSSB central SCADA at Shimsha Bhavan and ensure that OCEMS data/Flow meters data transmitting to central SCADA and KSPCB/CPCB server as per the instructions of the BWSSB engineer in charge.

QUARTERLY

1) Relay testing and calibration of meters, gauges, instruments
2) Calibration of motor speed
3) Level gauges
4) Calibration of all level meters, flow meters and energy meters.

YEARLY

1) Checking for overhauling of equipment wherever required
2) Improvements if required for operation of motors
3) Testing of all equipment's and instruments

4) **FAULT REPORTING**

Efficient fault reporting is critical to ensuring the smooth operation of an SBR-based UWTP. Below is a structured fault reporting framework:

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1. Purpose of Fault Reporting

Fault reporting is aimed at:

- Identifying issues that impact plant performance.
- Ensuring prompt rectification to minimize downtime.
- Maintaining compliance with environmental regulations.

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2. Common Faults in SBR Technology

1. **Mechanical Faults**
    - Pump or blower failure.

- Valve malfunctions (e.g., stuck or leaking actuators).
- Diffuser clogging.

2. **Electrical Faults**
   - Power outages or voltage fluctuations.
   - PLC or SCADA system failures.
   - Faulty sensors or instruments (e.g., pH, DO, or flow meters).
3. **Process Faults**
   - Inconsistent influent characteristics (e.g., pH, COD, or BOD spikes).
   - Sludge bulking or foaming in the aeration basin.
   - Poor sludge settling in the decanting phase.
4. **Operational Faults**
   - Improper chemical dosing (e.g., coagulants or pH adjusters).
   - Blockages in pipelines or channels.
   - Failure to meet effluent quality standards.

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3. Fault Reporting Process

1. **Fault Detection**
   - **Automated Alerts**: Use SCADA systems to monitor real-time data and generate alarms.
   - **Manual Observation**: Operators should regularly inspect equipment and process performance.
2. **Documentation**
   - Record the fault in a fault logbook or Computerized Maintenance Management System (CMMS).
   - Include the following details:
     - Date and time of detection.
     - Description of the fault (symptoms and affected components).
     - Operational parameters at the time of the fault.
     - Immediate actions taken.

3. **Immediate Notification**
    - Notify the designated personnel (e.g., plant manager or maintenance engineer) via email, phone, or the reporting system.
    - Escalate critical faults to higher management or specialized technicians.
4. **Root Cause Analysis**
    - Assign a team to investigate the root cause of the fault.
    - Use tools like fishbone diagrams or the 5 Whys method for analysis.
5. **Corrective Action**
    - Implement corrective measures (e.g., part replacement, process optimization).
    - Test the system to confirm the fault has been resolved.
6. **Preventive Measures**
    - Update the maintenance schedule to prevent recurrence.
    - Train staff on the issue to enhance awareness and preparedness.
7. **Reporting Closure**
    - Mark the fault as resolved in the system.
    - Provide a detailed report, including:
        - Root cause.
        - Actions taken.
        - Suggestions for future prevention.

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4. Fault Reporting Template

A structured fault reporting format can be as follows:

Field	Details
Date and Time	[Insert Date and Time]
Fault	[Brief description of the

Description	fault]
Affected Area	[Equipment/Process affected]
Operational Parameters	[Values of key parameters]
Initial Actions Taken	[Immediate measures to mitigate the issue]
Root Cause	[Identified root cause]
Corrective Action	[Details of actions taken]
Resolution Time	[Time taken to resolve the fault]
Preventive Measures	[Steps to prevent recurrence]
Reported By	[Name and Designation of the reporter]
Verified By	[Name of verifying authority]

5. Key Practices for Effective Fault Reporting

1. **Automation Integration**: Utilize SCADA or IoT-enabled systems for early fault detection and automatic reporting.
2. **Real-Time Alerts**: Set up email or SMS notifications for critical alarms.
3. **Training**: Train staff on fault identification and reporting procedures.
4. **Standardized Formats**: Use consistent fault reporting templates for clarity.
5. **Regular Audits**: Periodically review fault logs to identify recurring issues and improve reliability.

When a fault becomes apparent on any equipment, it is imperative that fault is reported and action taken in orderly manner. It is suggested to maintain “Fault Reporting Sheets” with possible coding and initiate a suitable response, setting priorities and planning workloads.

Guidance Notes

The “Fault Reporting Sheets may contain the following.

Date	The date on which the fault is identified
WIN no.	Works Identification Number (number which identifies item of equipment)
Priority Code	In the form of Number/ Letter No. 1 – Essential to works operation No. 2 – Desirable but not essential No. 3 – Not essential to works operation A – Action required within 24 hours B – Action required within 7 days C – Action required within 14 days
Work shop E/ M/ I	Indicate type of Fault E – Electrical M – Mechanical I – Instruments
Fault Code	Indicate condition of fault A – Unit failed B – Exhibiting signs of imminent failure C – Exhibiting signs of wear
Location	Position on site
Details of fault	indicate nature of fault and work required
WON No.	Works Order Number, this relates to any request for work to be carried out and enables records to be kept

Authorized by	Initials of the person responsible for authorization

At present it is not possible to fully complete report sheets as WIN numbers and priority code have not been set. These should be set as soon as the asset register is completed for the wastewater Treatment Plant. It is suggested that appropriate sections of the fault report sheet be filled in by a designated senior officer at the wastewater treatment Plant every day, whether or not any faults have been identified on that day. The completed fault sheets must be signed and distributed to staff responsible for maintenance duties and a copy sent to the Executive Owner’s Representative. A second copy should be retained on site such that the responsible officer may check on action taken and achieve details of faults, which have arisen on works.

BRIEF DESCRIPTION OF THE PLANT:

KADUGODI	
Design treatment capacity	6 MLD
Design hourly average flow	250 m^3/hr
Diurnal peak flow factor	3.1
Diurnal lean factor	0.5
Hydraulic hourly peak flow	774 m^3/hr
Hydraulic hourly lean flow	126 m^3/hr

1.Characteristics of the Sewage

The plant is designed for the following influent characteristics of wastewater.

Parameters	**Design Value**(ref. note 1)
Temperature	24 (min) deg, C 27 (max) deg C
pH	6.5 – 7.5
Total Suspended Solids (TSS)	450 mg/l
Volatile Suspended Solids (VSS)	380 mg/l (84.4 % of TSS)
BOD_5 @ 20^0 C	350 mg/l
COD	800 mg/l (max.)

Total Kjeldahl Nitrogen (TKN)	70 mg/l
Ammonical Nitrogen (N-NH_4)	45 mg/l
Nitrate Nitrogen (N-NO_3)	Nil
Total Phosphorous (TP)	7 mg/l
Total Alkalinity	370 mg $CaCO_3$/l
Fecal Coliform	2 x 10^5 MPN/100ml
ratio BOD_5 : TKN	$\geq$ 5
ratio BOD_5 : TP	$\geq$ 50

Treated Effluent Quality Requirements

Parameters	**Units**	**Prescribed limits** **(outlet of Chlorine Contact Tank)**
pH	-	5.5 – 9.0
BOD_5	mg/l	$\leq$ 10
COD	mg/l	$\leq$ 50
Total Suspended Solids (TSS)	mg/l	$\leq$ 10
Ammonical Nitrogen (N-NH_4)	mg N/l	$\leq$ 5

Total Nitrogen (TN)	mg N/l	≤10
Alkalinity (min)	mg $CaCO_3$/l	>70
Total Phosphorous (TP)	mg/l	≤ 1
Residual Chlorine	mg/l	0.25
Fecal Coliform	MPN/100ml	≤ 100

Inlet Chamber, Coarse Screen Channel & Terminal Sewage Pumping Station

1.1 Inlet Manhole & Inlet Chamber

Raw sewage pipe line (700 ND Dia) is connected to Inlet Manhole. From Inlet Manhole is connected to Inlet Chamber with 700 ND pipe and sewage flows to Inlet chamber from Inlet Manhole.

In the Inlet Chamber two manually operated penstock gates provided to distribute the raw sewage to coarse screen channels. And also one overflow wear gate provided to divert the sewage from Inlet Chamber.

1.2 Coarse Screens

The Coarse Screens are installed in coarse screen channels before the TSPs sump. In case of screens jammed with screening material, an automatic jam removal mechanism is proved for screen to remove the jam. The screenings removed by the screens will fall on the belt conveyor, installed below the screens chute. From belt conveyor the screenings will be conveyed to a mild steel chute and collected in trolley positioned below the chute at ground level.

At upstream of each screen channel one manual operated penstock gate is provided for isolation of screen channel at the time of screen maintenance.

- **TSPS Coarse Screens**

  - *Number of Screens..... 2 (1W+1S)*

- *Peak flow capacity per screen (approx.)* *0.215 m^3/sec*

- *Bar spacing.....* *60 mm*
- *Type .....Climber type, mech.*
- *M.O.C. of screen.....* *SS316*

1.3 TSPS Wet Well

- **TSPS Wet Well**

Coarse screened sewage is collected in one common chamber. From common chamber, sewage flows to Wet Well. The wet well is two compartment circular structures. Isolation gates are provided for each compartment. Each compartment is provided with air vents and drain pit.

- Raw sewage pumps :

- *Type of raw sewage pumps.....* *Submersible*
- *Nos. of pumps.....* *3(2W+1S)*

Note: It may be noted that the IL & TWL of the STP Inlet Manhole, TSPS Coarse Screen and TSPS Wet Well is below the HFL of Receiving waterbody. Hence, the overflow for all these units will be affected from Inlet Chamber overflow arrangement.

1. Medium Screen Channel, Degritting Unit & Grit Classifier (Head works)

2.1 STP Inlet Chamber

The raw sewage, pumped from TSPS, will be received in the Distribution Chamber of Medium Screens. Thereafter, it will flow by gravity to Mechanical Screen Channels. The following are the details of the Inlet Chamber.

The inlet chamber will be provided with RCC maintenance platform all along the length of the channel and also for operating gates. Peripheral

railing of 1.2m height, of aluminum has been provided. Overflow arrangement from inlet chamber with necessary overflow weir will be provided. The overflow line will be of RCC-NP3 class pipe, connected to Plant Drain-out Line. The inlet Chamber will also be provided with access Staircase / Ladder.

2.2 Mechanical Medium (Coarse) Screens

The Raw sewage from the Distribution Chamber will flow by gravity into a two numbers of screen channels, constructed in RCC. Two numbers of medium screens installed in screen channels

The Screens will be operated in parallel. Screenings from the medium screen in operation will be collected in a common Conveyor Belt and dropped into a trolley for disposal. The individual Screen Channels will be provided with manually operated Inlet/ Outlet penstock gates for isolating the channel/screen at the time of maintenance.

Ultrasonic level sensor will determine the head loss through the screens and operate the screen, when the screen is in Auto Mode.

The following are the details of the **Channel &Mechanical Medium Screens:**

- *Nr. of channels & mechanical screens.... 2 (1W+1S)*
  - *Channel length upstream of screen... 3 times of channel width*
  - *Design liquid depth (max.)..... 1.2 m (approx.)*

- *Type of mechanical medium screens..... Multirake type bar screen*
  - *clear opening..... 6 mm*
  - *Wetted parts M.O.C..... SS 316*

The mechanical screens will have controls for manual & auto start & stop, level switch with high level alarm, Overload protection switch and Overload alarm.Suitable RCC platform will be constructed along the screen chamber to reach the screens for closer inspection of all screens and conveyor system.

2.3 Grit Chambers

The screened sewage will flow by gravity through a common channel into a set of **Detritus type Mechanical Grit Chambers,** constructed in RCC. The mechanical Grit chambers will be of square shape, placed on both sides of the central manual grit channel.

Each Detritus type Mechanical Grit Chambers will have the following:

- A **centrally driven, full diameter mechanicalgrit scrapping device,** to scrape the settled grit to a side pocket.
- An **Integral inclined trough with chain-in-flight rake type grit classifier mechanism,** to lift the grit from the collection pocket above the water level and drop through a chute on to a platform or trolley.
- An **organic return pump,** to return sewage water collected in the pocket back into the Grit Chamber.

The following are the details of the **Detritus typeGrit Chamber Unit:**

- *Nr. of Detritus type grit chambers..... 2 (2W)*
  - *Design min. grit particle size of removal 0.150 mm*
  - *Design surface loading ..... 1,244 m^3/m^2.day*
  - *HRT at peak flow..... 60 sec*

- *Design liquid depth..... 1.0 m (approx.)*

The screened sewage flows and enters a grit chamber. Entry of grit chamber deflectors is provided to equally distribute the flow to entire grit chamber. The grit will settle in the main chamber and after de-gritting, the sewage will overflows into a common outlet channel, connected to a Parshall flume.

The settle grit in grit chamber is scrapped and conveyed to grit classifier channel. The grit collected in classifier channel is raked and pushed upwards direction with classifier mechanism, so that solid grit will come up and the liquid waste will be remaining in the channel. The dewatered grit will fall into a chute (made by GI) and collected in a bin / trolley positioned at ground level below the chute. The Liquid in the grit classifier channel is pumped back to grit chamber with organic return pump

Manual penstock gates are provided at the inlet of each Grit Chamber unit, to keep it off-line for any maintenance/repair/cleaning work.

2.4 Parshall Flume

The pretreated sewage exiting the Grit Chambers will be combined in a common channel for flow measurement through a **Parshall Flume.**

The Parshall Flume is designed as per the CPHEEO standards. A clear length of at least ten times the flume throat width upstream of the flume throat and at least five times the flume throat width downstream of the throat is provided for steady state flow.

The following are the details of the proposed **Parshall Flume Channel**:

- *Design flow range..... 2.85 MLD – 26.35 MLD*
  - *construction..... RCC*
  - *throat width..... 1 ft (0.305 m)*

The flow measurement will be instantaneous and cumulative. In the Parshall Flume an **ultra-sonic level measuring device** is provided to measure the flow at local and remote read out of the flow into the plant.

The Parshall Flume Channel will lead the sewage flow to a Sequential Batch Reactor (SBR) Distribution Chamber.

2.5 Secondary Treatment – SBR

The de-gritted sewage will be biologically treated for the removal of soluble & particulates organic matter, phosphorus and nitrogen.
The incoming combined sewage from Detritus Grit Chamber will flow into a SBR Distribution Chamber (Splitter Box), for biological treatment. From parshall flume the Raw sewage flows to splitter box of SBR, where it is mixed with alum solution and flows over a weir to SBR Distribution Channel. it is a rectangular unit in RCC construction.

Manual stop logs are provided at the inlet of all the individual SBR compartments. After Stop logs before each SBR basin motorized penstock gate is provided to allow sewage to the Inlet of SBR Cell.

Sequential Batch Reactor (SBR) Process

The SBR System is designed to treat the sewage in a Single – Stage, Fully Automatic SBR Reactors. Three (3) numbers of SBR Basins are provided, which will work in sequence. The Systemwill be complete with Air Blowers, Diffusers, Return Activated Sludge (RAS) Pumps, Surplus Activated Sludge (SAS) Pumps, Decanters, Auto Gates & Valves and PLC etc. The SBR Basins are operated at TWL and hence in each case, the decanting will be carried out from TWL.

The Sequencing Batch Reactor (SBR) is a variant of Activated Sludge Process (ASP) wherein all the unit process of a classical ASP Process – Biological Treatment comprising of Carbon, Nitrogen and Phosphorus removal, settling, clarification, etc. are carried out in the same reactor tank. The process is carried-out in sequences comprising of the following main steps:

- Filling,
- Reacting, (Aerobic Biological treatment),
- Settling of Biomass for clarification,
- Decanting, of treated and clarified Effluent
- Idling, (making ready to repeat the cycle).

Each SBR Basin comprises of a **Selector Basin** and **Reactor Basin.**

Selector Basin

From the distribution channel, the sewage flows to the Selector Basin of the SBR System. The selector serves main purpose of improving the Settling Characteristics of the Sludge.The selector operates without aeration, and the process environment is Anoxic.

For contacting the sludge with the incoming sewage, the activated (biological) sludge is pumped (returned) from the main Reactor basin (the aerated part) to the selector.

The following are the details of the **SBR Selectors Basin:**

- Total nos. of selectors basins..... 3 (1 per Basin)

- Air pulse for re-suspension of settled solids 0.9 $Nm^3/hr/m^3$

Reactor Basin

From the selector zone, the mixture of sewage and sludge flows to the main Reactor Basin of SBR.In the Reactor Basin, a network of fine bubble membrane diffusers at the tank bottom provides air for the main biological processes of the wastewater purification. The diffusers are fed with compressed air from the air blowers. The aeration also keeps the sludge in suspension and no further mechanical mixing equipment is required.

2.5.1 WAS Extraction

The waste activated sludge (WAS) / excess biological sludge is pumped from the SBR reactor to the Secondary Sludge Thickener. The design of **WAS Pump** is as follows:

- *Design basis*
  - *WAS concentration..... 8.0 g/l*
  - *Total working time /cycle..... 15 min*
- *WAS Pumps*
  - *Quantity .....1(1W) per Basin*
  - *Type .....submersible pump*

The sludge extraction pumps will be operated during Decant phase to extract the sludge at its maximum concentration.

Chemical dosing for Phosphorus removal:

Alum Dosing Facility for chemical precipitation of phosphorus is provided.The consumption of the chemical will be established by the plant manager based on the Phosphorus content in the treated effluent.The solution of chemical is dosed in the common compartment of SBR Distribution Chamber (splitter box), to polish-off the phosphorus in the SBR Reactor to achieve the stringent effluent quality for phosphorus.The chemical dosing system comprises of 30 days Storage, Solution preparation Tanks, Dosing Pumps and accessory equipment.

2.6 Chlorine Contact Tank

The clarified effluent from the Sequential Batch Reactor is conveyed through a gravity pipe & disinfected with chlorine before its disposal to receiving water body.Sodium Hypochlorite Solution is dosed for disinfection. This disinfection process is carried-out in a specially designed plug flow Chlorine Contact Tank (CCT) having longitudinal baffles to lengthen the water travel length with the tank before it reach the outlet. The Chlorine contact tanks open from the top, will have two chambers to be operated in parallel, and which could be isolated with the help of manualpenstock gate at the inlet.

The following are the details of the proposed **Chlorine Disinfection System:**

- ***Design basis***
  - *HRT at peak flow (as per NIT)..... 30 min*
  - *Dosing at Peak Flow..... 5 ppm*

The mixing of Sodium Hypochlorite Solution with the effluent will be done by chlorine diffuser pipe placed at the inlet of the CCT. **Totalresidual chlorine monitor** will be provided downstream of the chlorine injection points for monitoring the total residual chlorine in the water.

The residual chlorine signals will be displayed at the local control panel and at the central HMI. High and low chlorine residual levels will raise alarms at the local control panel and at the central HMI.

2.7 Treated effluent disposal

A 700 mm dia DI pipe will be provided for the gravity flow of disinfected secondary effluent for final disposal .

2.8 Sludge Handling System

The excess/ surplus sludge from the SBR Reactor will be treated in Sludge Handling System.

2.8.1 Gravity Sludge Thickener

The surplus sludge from the SBR is directly pumped to a conventional gravity sludge thickener of radial flow type.

The pumped sludge enters the feed well zone and underflows and spreads in the main tank for effective settling. The sludge settles on the sloping floor of the tank from where it is mechanically thickened, scrapped towards the central pocket for sludge collection & discharge. At periphery the flow will pass through 'V' notch weir along with baffles and then will be collected into an annular RCC launder provided all around the periphery of the tank. Both, Baffle and 'V' notch weir will be made out of 5 mm thick FRP, and Weir will be provided with clamps for making adjustments. The thickener will be in RCC construction designed as liquid/water retaining structure. The floor will be slopping radially at 1:8 towards the centre, so that the sludge collection to the centre pit (cone).

The sludge from the thickener sludge pit will be withdrawn under hydrostatic pressureby means of suitable 150 dia DI pipe. The sludge pipe line will have an extra tee with a vertical telescopic pipe outside the periphery of the thickener for the flushing and cleaning of choking's etc.

The sludge withdrawal pipe is provided with a manual operated knife edge gate valve, which is used in the event of pipe flushing or closing the sludge line. As the sludge line is directly connected to the sludge extraction pumps, the intermittent extraction of sludge controlled will be by the pump operation.The supernatant then overflows into the effluent launder and is recycled to the inlet of head works by pumping through Plant water drain pump / supernatant sump. The launder is provided outside the thickening tank. The following are the details of the **Sludge Thickener and associated works** provided. **Design basis**

- *Sludge loading..... 25 kg/m^2.day*
- *Thickened sludge conc..... 25 g/l*
- *Sludge storage ..... 24 hr (approx.)*
- *Type . conventional gravity type- centrally driven*
- *No. Of thickener required/provided..... 1 (1w)*

- *Construction..... rcc*
- *Side water depth..... 4.5 m*

- *Thickened sludge pumps design basis*
- *No. Of primary thickened pumps..... 2 (1w+1s)*
- *Type .....progressive cavity type*
- *Flow control..... by VFD*

The thickened sludge pump transfer the thickened sludge to sludge storage tank facilitated with paddle type agitator. The thickened sludge line is provided with electromagnetic type flow meter for flow measurement of sludge.All other valves are manually operated knife gate valve.

2.8.2 Sludge Storage Tank

The Thickened sludge is pumped to Sludge storage tanks. These tanks are designed to provide all the following functions:-

- Store sludge for the periodic feeding of centrifuges.
- Sludge Mixing.

These are cylindrical RCC Tank. The sludge is routed through the inlet pipes from the inlet distribution box and filled up to a predetermined level in the lower portion of the tank. A sludge overflow pipe in the inlet of distribution box of suitable diameter is provided to connect to the plant water drain sump. Provision for mechanical mixing of the stored sludge is made to prevent sludge stratification, and to keep the sludge concentration uniformly. The sludge tank is covered and facilitated with paddle type mixer and air vent on to atmosphere.

- **Sludge Storage Design basis**

  No. of Sludge Storage Tank..... 2 (2W)

  o storage requirement..... 3 days

2.8.3 Sludge Dewatering System

2.8.3.1 Centrifuge Feed Pump

A set of Centrifuge Feed Pumps are provided to draw the thickened sludge from sludge storage sump and feed the Sludge Dewatering Machine - Centrifuge Decanter. Each pump is rated to pump in 8 hours the volume of sludge to be dewatered by one centrifuge.

The following are the details of the Centrifuge sludge feed pumps:

- **Centrifuge feed pumps**

  o No. of pumps..... 2 (1W+1S)

- *type .....progressive cavity type*
- *pump capacity..... 10 m^3/hr*

2.8.3.2 Polyelectrolyte Make Up and Dosing Pumps

Dewatering Poly Dosing System, comprising of dosing pumps, automatic polyelectrolyte solution preparation facility and all associated pipe-work and valves etc. will be provided to dose polyelectrolyte into the dewatering machine feed line.

The following are the details of the Dewatering Poly Dosing System.

- *Sludge dewatering per day (6d/w).....*
- *Design poly dosing rate..... 5 kg/MTDS of sludge*
- *Dosing solution concentration..... 0.2 %*
- *No. of dosing pumps..... 2 (1W+1S)*
  - *type of dosing pump..... diaphragm type/equiv.*

Automatic Poly Solution and Preparation system is a continuous type system.

One Dosing pump is dedicated to one dewatering machine. The duty metering pump is manually selected and start and stop simultaneously with the associated centrifuge feed pump.

2.8.3.3 Mechanical Sludge Dewatering

Decanter type centrifuges (also known as a solid bowl centrifuges) will be used for the mechanical sludge dewatering operations. While the design of the centrifuge machine will be generally in line with the tender requirements, certain specific features - like fluid coupling/mechanism to accelerate the rotor to operational speed, will be as per the specific standard design Manufacturer.The following are the details of the Centrifuge Decanter type sludge dewatering machines :

- **Design basis**
  - *Dewatering system operation..... 6 days/week, 8hrs/day*
- **Sludge dewatering machines**
  - *Type .....centrifuge decanter*
  - *No. Provided..... 2 (1w+1s)*
  - *Dewatering M/c capacity..... 10-15 m^3/hr (max.)*

Operation of each centrifuge and its associated dedicated feed pump, polyelectrolyte dosing system, and flushing system and other plant is automatic, once the start-up procedure has been initiated by the operator.The polyelectrolyte and sludge feed pumps will not start until the centrifuge has reached its full speed. Polyelectrolyte is dosed to the sludge flow via an in-line injection system and mixer designed to achieve rapid and even distribution throughout the sludge. The conditioned sludge will be delivered into the inlet chamber of the centrifuge.

After stopping the sludge and polyelectrolyte pumps, the centrifuge is flushed out with clean water. This will be carried out while the centrifuge is still running. The flushing water is diverted to the centratedrain.The operation of a low level sensor in the thickened storage tank will automatically stop the flow of sludge to the centrifuge.

The centrifuge will be mounted on heavy-duty vibration isolators, located between the machine and the supporting steelwork or

foundations, to damp vibrations and prevent vibration transmission. Two axis vibration monitors will be provided to stop the centrifuge automatically when excessive vibration is detected. Flexible connections is provided on the sludge fed system and the centrate system at the centrifuge.

The dewatered sludge discharge system is provided with flexible chutes discharging the sludge cakes on a moving conveyor belt, common for both the installed machines. The conveyor belt discharge the sludge cake into a trolley/truck inside the dewatering building, for its transportation for disposal.

The centrate from both the machines, through a common discharge pipe header, and routed to the Plant Water Drain Sump for return back to the plant inlet.

2.9 DISINFECTION

2.9.1 Sodium Hypochlorite Dosing System

The Chlorination System, is housed in the Sodium Hypochlorite Building, is mainly comprise of Bulk NaClO Storage in FRP / PE Tanks and Sodium Hypochlorite dosing pumps. NaClO Solution is provided to dose chlorine for disinfection. 2 nos. dosing pumps, are provided to dose with 8 mg/l chlorine dose at Peak flow. Normally, only one unit will operate with the other remaining as standby. However, during exceptional situation when the chlorine demand of the effluent is high, both the units are operated.The following are the details are ***Chlorine Disinfection System:***

- **Design basis**
  - *Average dosing rate at peak flow..... 6 ppm*
  - *Max. Dosing at Peak Flow..... 13 ppm*

- **Chlorination System**
  - *Nos. Of Dosing Pumps..... 2 nos.*
- **Sodium Hypochlorite Storage**
  - *Storage period..... 15 days*

Each dosing pump is equipped with manual appropriate chlorine dosing scale and a manual dose adjustment over the complete range. In addition

to automatic dosing adjustment, provision for manual setting of the dosing rate is built in the system.

2.10 Plant Drain Pump Station

A Plant Drain Pump Station will be provided to collect solids processing recycles form the supernatant of Gravity Sludge Thickener, centrate from dewatering machine and other miscellaneous waste flows such as cleaning and wash-down flows generated in the plant and pump them back up to the head-works for treatment through the plant.

The network of the plant process drains will be terminated at this Sump. The drain out connection from various units of the plant, in the form of RCC NP3 class pipes, will be connected to one / two common trunks lines of RCC NP3 class pipes, leading to the drain sump.The following are the details of the ***Process Drain Sump & Pumps:***

- **Design basis (as per NIT)**
  - *HRT .....10 min*
  - *Sump volume..... 4.2 m^3*

- **Plant Drain Pump (as per NIT)**
  - *Type .....submersible type*
  - *No. Of pumps..... 2 (1w+1s)*
  - *Pump capacity..... 25 m^3/hr*

Submersible pumps will pump out the plant process drain to the disposal system. Pumps suction and delivery piping will be MS Pipe. All valves will be manually operated sluice valve.The sump will be of suitable size to accommodate the submersible pumps.A clear space of 1 m will be provided between pumps for easy access to the pump. A clear space of 1.5 m will be provided from the end walls. The sump will be provided with 1.20 m wide RCC slab, constructed over the sump with 1.0 m high pipe railing. The sump will be designed and constructed as water retaining structure. Necessary pump lifting arrangement in the form of manually operated crane will be provided for maintenance.

2.11 Plant Water System

2.11.1 Plant Water System (non-potable)

The plant service water sump & pump house, is located near to Chlorine Contact Tank, consist of a sump and a super structure, to provide water for gardening, flushing, cleaning of equipment, etc.The treated effluent will flow into this sump from the outlet effluent channel. On the opposite side of the inlet to the sump, a weir of suitable width and height is provided to allow excess treated effluent to flow into the effluent channel.

The following are the details of the ***Plant Service Water Sump & Pumps:***

- **Design basis (as per NIT)**
  - *HRT .....10 min*
  - *Sump volume..... 4.2 m^3*
- **Plant Drain Pump (as per NIT)**
  - *Type .....submersible type*
  - *No. Of pumps..... 2 (1w+1s)*
  - *Pump capacity..... 25 m^3/hr*

Submersible pumps will pump out the treated effluent to the in-plant service water system. Pumps delivery piping will be MS Pipe. All valves are manually operated sluice valve.

Necessary pump lifting arrangement in the form of manually operated crane is provided for maintenance of pumps.

2.11.2 Borewell - Fresh Water System

Bore Well pump is provided for pumping fresh groundwater to an Overhead Tank, of 10,000 L capacity, located on top of the Chemical Building. The storage tank system is connected to supply water for multiple applications including chemical solution preparation, human/domestic non-potable needs, laboratory needs, and other general cleaning and flushing needs. The water system is designed to provide adequate water pressure for all of the above applications.

The following are the details of the ***Fresh Water System :***

- **Pump (as per NIT)**
  - *Type .....borewell type*
  - *No. Of pumps..... 1*
  - *Pump capacity..... 10 m^3/hr*

<u>Tertiary Treatment Unit:</u>

1. Intermediate (Disc Filter Feed) Pump Sump

Disc Filter Unit is installed between SBR Decanter Chamber and CCT. Due to insufficient head between Decanter Chamber and CCT, Intermediate pump sump is provided before the Disc Filter Unit to pump the clarified water to Disc Filter Unit.

Clarified water from SBR Decanter outlet flows by gravity to Intermediate Pump Sump. There is isolation valve in inlet line of Intermediate Pump Sump. In pump sump 3 (2W+1S) submersible pumps are provided to pump the clarified water to Disc Filter chamber. From Disc Filter chamber clarified water flows through the discs provided on disc filter unit and flows out to disc filter outlet chamber. From Disc Filter outlet chamber flows by gravity to CCT.

In case the disc filter feed pumps fails or at the time of Disc Filter Unit maintenance, clarified water is bypassed to CCT through bypass line. In Disc Filter bypass line motorized isolation valve and flow meter is provided.

2. Disc Filter

Clarified Water feed from Disc Filter Feed pumps flows to Disc Filter Chamber. It passes through the filters (outside to inside) and reaches to central rotor drum and flow out to filter outlet channel. From there it flows CCT.

When Filter elements are choked the water level (head loss) in Disc Filter Chamber increase and backwash process starts. There are 7 backwash pumps to clean the filter segments. One settled sludge evacuation pump to evacuate the sludge settled at the bottom of Disc Filter chamber.

3. Plant Specification

Disc Filter Feed Sump

Sl. No	**Description**	
1	Quantity	1
2	Retention Time (Minutes)	5 Minutes
3	Size (meter)	9.0 x 2.7 x 2.5 (SWD)
4	Volume M3	60.7

Disc Filter Feed Pumps

Sl. No	**Description**	
1	Quantity	3 (2W + 1S)
2	Type	Submersible
3	Pump Model	ASTRA SA 200-360
4	Supplier	Kishore Pumps, Pune
5	Capacity M3/Hr.	337
6	Head (meter)	8
7	Speed (RPM)	960
8	Motor Rating (KW/HP)	15 (20)
9	Tag No.	514_PO101A /

		101B /101C
10	Starter	VFD

Disc Filter Chamber

Sl.No	Description	
1	Quantity	1
2	Retention Time (Minutes)	5 Minutes
3	Size (meter)	7.315 x 3.3 x 3.11(SWD)
4	Volume M3	75
Disc Filter Outlet Chamber		
1	Quantity	1
2	Size (meter)	0.7 x 3.3 x 0.17(SWD)
3	Volume M3	75

Disc Filter Unit

Sl.No	Description	
1	Quantity	1
2	Type	OUT to IN (Fully Submerged)
3	No. of Backwash Pumps	7
4	Settled Sludge Pump	1
5	Supplier	Micro Transmission System
6	Capacity M3/Hr.	775

Knife Gate Valves (Non Rising Spindle)

Tag No.	514_VM401	514_VM 402,	514_VM403A, 403B, 403C	514_VM404	514_VH405, 406
Type	Motorised	Motorised	Motorised	Motorised	Manual
Location	Disc Filter Bypass line	Inlet to Intermediate Sump	Disc Filter Feed Pumps Discharge line	Flow Meter Inlet	Flow meter outlet & Bypass
Supplier	Jash	Jash	Jash	Jash	Jash
Quantity	01	01	03	01	02
Size	500 mm	500 mm	300 mm	400 mm	400 mm

Flow Indicator Transmitter

Tag No.	514__FIT001_
Location	Disc Filter Feed Pump Discharge Header line
Quantity	1 No
Type	Magnetic
Make	Krohne Marshall Pvt Ltd.
Range(Min-Max)	0 - 700 m3/h

Transmitter Details	
Type	Microprocessor Based
Model	IFC 050
Housing	Die Cast aluminium with Polyester topcoat
Protection For Transmitter Enclosure	IP67
Mounting	Wall Mounted
Display	LCD
Output signal	1x 4-20mA HART + 1 x Pulse + 1 x Status + 1x Modbus
Power Supply	230V AC/ 50Hz
Sensor details	
Type	Pulsed DC Excitation
Model	OPTIFLUX 4000
Electrode Material	SS316L
Process Connection Material	Flanges of Carbon Steel SORF
Protection	IP68

Level Switch

Tag No.	514__LS001_

Location	Intermediate Pump Sump
Quantity	1 No.
Make	Pune Techtrol
Switch Details	
Type	Conductivity
Electrode Material	SS316L/SS316Ti
Controller Details	
Type	Point Level Switch Controller (CNS)
Mounting	DIN Rail Mounted
Supply Voltage	90 to 270V AC

2 Functional Guarantees

2.1. Effluent and Sludge Quality

The Bidder guarantees that the effluent and sludge quality requirements specified in Section 4 of Volume2 will be fully and completely met, under either actual or simulated design raw sewage flows, loadings, and characteristics, as demonstrated by the Tests after Completion. The bidder further guarantees that the specified requirements will continue to be fully and completely met throughout the Operation andMaintenance Period.

2.2 Symbol Definitions

The following symbol definitions shall apply for the subsequent clauses of this schedule:

UD = Guaranteed not-to-exceed energy usage under design average influent sewage flow and BOD conditions, to be filled in by bidder (kWh per month)

UA = Guaranteed not-to-exceed energy usage under actual monthly average influent sewage flow and BOD conditions, to be calculated per formulae provided in subsequent clauses (kWh per month)

QD = Design average influent sewage flow specified in bid documents (MLD)

SD = Design average influent sewage BOD concentration specified in bid document (mg/L)

QA = Monthly average of actual metered influent sewage flow (MLD)

SA = Flow-weighted monthly average of actual measured influent sewage BOD concentrations (mg/L)

2.3 **Electrical Energy Usage**

The Bidder guarantees that electrical energy usage of various components of the Works will not exceed the values listed in the table below. as demonstrated by the Tests after Completion and throughout the Operation and Maintenance Period. The actual electrical energy usage shall be directly metered and compared to guaranteed numbers on a monthly average basis.

Item	Guaranteed not-to-exceed energy usage under design average influent sewage flow and BOD conditions, to be filled in by	Guaranteed not-to-exceed energy usage under actual monthly average influent sewage flow and BOD conditions, to be calculated per

	bidder Up (kWh per month)	formula below UA (kWh per month)
Kadugodi STP		UA= UD X QA + QAXSA QD + QD X Sp

Penalty Clause

Power consumption of electrical energy for Operation and Maintenance of the constructed Works for each STP and ISPS under the Contract.	. Damages payable by Contractor to Employer on a monthly basis shall be equal to the actual cost of the excess energy used for Operation and Maintenance of the Works for each STP and ISPS under the Contract, based on the guaranteed consumption provided by the Contractor and the current rates charged to the Employer for electricity consumed. Such payable will be assessed for each month during the O&M Period in which the actual power consumption exceeds the guaranteed power consumption as calculated.

Effluent Quality: Failure to achieve the specified effluent quality requirement at the outlet of the chlorine contact tank during the Operation and Maintenance (O &M) period Parameter Specified Maximum Concentration BOD 15 mg/l TSS 30 mg/l NH4-N 1 mg/l NO3-N 10 mg/l TP 1 mg/l Total coliform 200 MPN/100 ml	Performance Damages as Percent of the O & M Monthly payment (or, for Contracts with more than one STP, as Percent of the STP O & M Monthly payment for each STP that fails to pass the Tests during O & M period for each additional "quantum" (as defined below) of the effluent quality parameter, or part thereof, beyond the specified maximum concentration, present in the actual effluent produced during the Tests on Completion: Percent of (STP) For each additional O & M Monthly payment or part of parameter 2% 5 mg/l, BOD 2% 1 mg/l, TSS 2% 0.2 mg/l, NH .- N 2% 1 mg/l, NO .- N 2% 0.2 mg/l, TP 2% 200 MPN/100 ml

	. For a given STP, Performance Damages shall not exceed 5% of that STP's STP O & M Contract Price. However, if more than one STP fails the Tests on Completion, then the 5% Performance Damages limit shall apply separately to each STP. Further, all remedies other than including but not limited to construction of additional facilities, additional equipment and repair and/or replacement of the installed equipment shall continue to be fully available to the Employer, and the Employer may choose to invoke any or all of them at any time in accordance with the terms of the Contract. Performance damages.

HANDING OVER

17.1 General

This section applies to procedure(s) on handing over the works and sites related to Sewage Treatment Plant and Intermediate/Terminal Sewage Pumping Station back to the Employer at the end of 5 years period of operation and

maintenance by the Contractor. This shall include all civil structures, mechanical systems including pumping main system,Disc filter system, the instrumentation/control & automation system, communication system, electrical system including 11 kV/0.433kV substations, SCADA systems, all ancillary buildings and campus area.

The procedure for Handing Over shall include the final examination/tests of the system by the Engineer. O&M Contract Completion Certificate shall be issued by the Employer after the successful final examination/tests and submission of the relevant documents.

17.2 Duties and Responsibilities

1) All cost for the examination, tests and preparation of any documents of the activities shall be the Contractor's responsibility.

2) The Contractor shall provide all necessary labour, materials, and fuel required for tests.

3) Conduct Joint Inspection Prior to Contract Completion:
   To verify the condition of Works / Facilities at the end of 5 years of operation and maintenance for identifying damaged works, replacements and other works to 'be carried out to satisfy the requirements of Operation and Maintenance Plan, a joint inspection will be carried out by the Engineer, Employer and contractor.

4) Conduct Tests prior to Contract Completion:
   To verify the plant condition and performance of plants including pumps, blowers, valves, gates and other equipment at the end of 5 years of operation and maintenance,

Contractor shall conduct all the required Tests prior to Contract Completion. The contractor is responsible to conduct annual inspections of cranes & other lifting equipment, pressure vessels and other equipment as required by law/Govt.of Karnataka.

The inspection items are given below in Table 17.1 listed to this.

Table 17.1: Items to be examined at the End of 4 Years O&M Period

Items	Description
1. Appearance test /Visual examination (Damage/crack, differential settlement, soil settlement, peel off painting, m issing/lost,leakage of water/solution/gas, corrosion, condition of structures,	- All Civil structures, building including interior/exterior, fence/gate, stairs, others - All Mechanical & Electrical equipment/accessories, others - All Pipe line valves and gates, others - All Instrumentation and Control

2. Performance examination (Selection of operation mode, selection of facilities, flow/water level, overflow, vibration/noise level, speed of pump/motor, smoothness,	- Check Sequence, or Manual operation including water level, pressure sensors/protections, others - Check specification of all Mechanical equipment including pressure and water level gauges, pressure relief valves, others - Check specification of all Electrical equipment
3. Verification of rectified works (System, leakage, crack, damage, soil settlement, corrosion, others)	- Check a list of all defect items, history, tendency, repeating, others - Check a list of all miss operation and maintenance items, others
4 Operation skill	- Review of summary reports on O&M activities - Check time and motion of staff member, others
5 Waste Water analysis	- Location of sampling and time, and date
O/M Record	
7.Spare parts' dialofftels \c,-;\	

Items	Description
	- Check the quantity of inventory, others - Check maintenance tools and equipment,

5) Submission of the report on completion of O&M Contract:

The Contractor shall submit the completion report after pass the final examination/tests. The report shall consist of relevant documents, for request for issue the Completion certificate of 4 years O&M period, which is given below in Table 17.2 but not limited to this.

Table17.2: Documents to be handed over at the End of 4 Years O&M Period

Contents	Description
1. Outline	Outline - Summary of project, scope of work, location of project, main component with specification, others
2. Completion Photographs (At acceptance complete inspection, completion inspection and final inspection)	Photographs with short description - Civil (structural, buildings, others) - Mechanical, Electrical and I&C (equipment, facility, others) - Piping works
3. Inspection summary (At acceptance complete inspection, completion inspection and final inspection)	Appearance test /Visual/ Performance examination - Table of Summary of test activity based on daily and monthly - List of type of test, date, inspector, evaluation, comments Civil (name of structure, drawing no., drawings, design dimension, previous dimension, actual dimension, others) - Mechanical (name of facility and equipment, tag no., quantity, others) - Electrical (name of facility and equipment, tag no., quantity, others)
4. Main inspection data (At construction)	Summary of data with graphic /chart - Civil (plate load bearing test, compressive strength test, water retaining test, compaction field test, road construction works in STP, hydrostatic test, others) - Mechanical (disinfection test, others)
5. Inspection record (At acceptance complete inspection, completion inspection and final inspection)	Appearance test /Visual/ Performance examination/ Verification of rectified works - Civil (Refer to T : no.1,2,3) - Mechanical (Refer to Table 17.1, point no.1,2,3)

Contents	Description
	- Commissioning daily record (Sewage flow rate of designed and actual, name of operated facility, list of measurement and its time and reading value, raw sewage and treated sewage quality, value of V/A/kW of each equipment, others)
7. Sewage quality citification data (At acceptance complete inspection, completion inspectionand final inspection)	- Location of sampling and time, and date - Raw sewage and treated sewage - All Unit Process
8. Operation and Maintenance manual (Civil, Mechanical, Electrical and	Updated O&M Manual
9. O/M records	-Water quality analysis and production of electricity -Sludge and screenings handling amount -List of O/M record, Ledger and operation record -Various types of Ledgers and other plant organization charts and plant management records including cost and expenditure -History of troubleshooting -O/M record of a process, unit operation and equipment - Mechanical (name of parts, tag no., quantity, location of stock,
0. Spare parts list	- Mechanical (name of parts, tag no., quantity, location of stock, others) - Electrical (name of parts, tag no., quantity, location of stock, others) - Pipes & fittings (name of parts, tag no., quantity, location of stock, others) - Valve & Gates (name of parts, tag no., quantity, location of stock, others)
	-Others (name of p ., quantity, local n 4 f
71;1>,,Key list with	- - Name of key, I c03.c:iN togrpor„Ruantity, C

Gurgaon

Contents	
	material: reinforcement bar, cement, aggregate, sand, gravel, asphalt, crushed stone, chemical admixture, water reducing agent, pozzolana, water-tightness sheet, construction equipment, manhole, water-resistant coating, paint, windows, door, others) - Mechanical (all related equipment; screens, pumps, blowers, dewatering
12.Manufacture produced catalogue (Civil,	- Civil (all related material: reinforcement bar, cement, aggregate, sand, gravel, asphalt, crashed stone, chemical admixture, water reducing agent, pozzolana, water-tightness sheet, construction equipment, manhole, water-resistant coating, paint, windows, door, others) - Mechanical (all related equipment; screens,
13.Instruction manual (Civil,	- See above (11)
14.Factory inspection record or Quality assurance Instrumenta tion & r{eisio$_{ds}$	- Civil (all related material: reinforcement bar, cement, aggregate, gravel, asphalt, crashed sand, admixture, t

Contents	Description
	scrubbers, Chlorinators, scarper, conveyor, hopper, central drive& rotating mechanisms, pipes, valves, gates, pressure gauges, safety valves, safety equipment, flow meters, coating, painting, others) - Electrical (all related equipment: electrical wire, electrical conduit, motor, control panel, relay, transformer, heater, generator and silencer, timer, breaker, light/lamp, switch, street light, earthing, measurement equipment, air condition, communication equipment, electric pole, coating painting, ventilation fan, air duct, others) - Instrumentation & Control (all related equipment,
15.Photograph (During Construction,at defect liability, at joint completion inspection) (Civil, Mechanical, Electrical, Instrumentation	History of construction Replacement of defect liability - Civil: constructionsite before startingconstruction, earthwork, arrangement of bar, cleaning before placing, formwork, concrete mixing work, placing, vibrating, curing, remove of formwork, backfill, compaction, all field inspection and lab test, others - Mechanical: inspection at factory, receiving inspection, completion inspection, all field inspection and lab. test, others
16. Production samples (Civil, Mechanical,and Instrumentation &	All samples for technical approval - Attach Analytical instruments name, approved sign

Tese data shall be provided both in soft and hard copies, in proper professional format. All the documents should be signed by BWSSB then AE and AEE. Soft copies in editable format should be submitted in pen drive with properly organized manner in the folders with proper naming.

17.3 Specifications

Handing Over

The specification of materials used for repairs shall be the same as have been used in the original work. Specifications for any materials which were not used during construction shall be approved by the Engineer prior. to Handing Over.

the Contractor's responsibilities or are essential as per good industrial practices. The Contractor shall hand over all the components of works in good working condition for the following, but not limited to:

a) All pumps, motors and other mechanical equipment etc., at the sewage treatment plant and Intermediate/Terminal Sewage Pumping Stations (all works constructed in this Contract).

b) All required consumables required for functioning of plant with inventory of material.

c) All Electrical Equipments such as Transformers ,1 I kV Metal Enclosed Switchboards & Switchgears , 415 V metal enclosed switchgears (PCC) /MCC,415 V Power capacitor and control panel, Diesel Standby Generator with AMF Control Panel, and Synchronizing panel, Battery, battery charger and DC Distribution Board, Variable Frequency Drives, Non Segregated Bus Duct ,Power & control cables, Cable carrier system, Lighting system , Earthing and lightning protection systems of the Plant (All works constructed in this Contract).

d) All Instrumentation and control equipment etc., at the pumping stations (All works constructed in this Contract).

e) Administrative buildings etc. at the pumping stations (All works constructed in this Contract) in neat and clean condition.

f) AMC contracts with system / equipment suppliers, as necessary for PLC and SCADA system supplier or the authorized system integrator as executed the work for this project.

g) Lighting fixtures and the lighting system of all areas and replacement of all nonfunctional lighting fixtures.

h) Records for the followings but not limited to

- Water quality report and Bio-gas analysis
- Repair history of all mechanical, electrical and instrumentation control equipment in sewage treatment plant and Intermediate/Terminal Sewage Pumping Stations, and communication instruments;
- Logbooks through PLC system;
- Daily log of operations of all the important equipment with time tag;
- Hourly readings of water levels, pressure sensors, flow rates and

- Logbook format and the data to be included in the logbook;
- Last periodic maintenance done for all equipment/buildings of the system;

i) Required spares, general and special tools & tackles, test equipment and adequate inventory of required accessories or equipment itself for repair/replacement of defective electrical, mechanical, instrumentation and control system, pipe, and the communication system. However at the end of the Contract, the Contractor shall hand over the full spares, tools and tackles as supplied with the Contract by replacing the used items with fresh supplies of the same specifications.

j) Repair of the roads, buildings and campus area utilities.

k) Drinking water supply facilities at treatment plant and sewage pumping stations and all its units.

I) Record of stores for the electrical, mechanical and instrumentation and control

equipment as well as that for consumables. The records will include but shall not be)[1]
limited to:

- Materials received and issued for works;
- Proper arrangement of material in stores to ensure its safety and easy availability;
- Maintaining store areas in a neat and tidy condition;
- Keeping records and accounting for the incoming materials,
- Keeping records and accounting for the consumed materials.

m) 'Structures/buildings of campus areas of Sewage Treatment Plant and Intermediate/Terminal Sewage Pumping Stations and others built in the Contract must ensure adequate cleanliness, ventilation, illumination and structural safety. In addition to this, the general

1

17.4.2 Intermediate/Terminal Sewage Pumping Stations

The Contractor shall hand over all components of the works in good working condition

for 1

i) All facilities from inlet gate/valve to reservoirs, to pumps, motors, valves, cranes, flow

meters, compressor room, PLC control, Transformers, 11kV Metal Enclosed

Variable Frequency Drives, Non Segregated Power 84 control
Bus Duct carrier system, Lighting system , o~ugy- Co

Intermediate/Terminal Sewage Pumping Station (All works constructed in this Contract).

ii) PLC, including the hardware, software and all instruments, in good working condition.

iii) Entire control system and instruments as per the contract and manufacturer's recommendations.

v) Replacement of damaged controls, communication cables and power supply cables.

vi) Repair or replacement, as required, of all instruments such as flow meters, pressure transmitters, pressure gauges, level sensors/transmitters, float type level switches along with all other equipment.

vii) Calibration of all measuring/metering equipment or as recommended by the manufacturer. The calibration at manufacturer's works shall be done in case of major failure/ repairs of the instruments.

viii) Submission of daily and monthly customized reports produced by the local SCADA system.

ix) To provide all required consumables for a period of —12 months.

x) Repair of damaged moving parts, steel structures, and the RCC structure. Subsequently the repairs, cleaning disinfection and painting of all civil works must have been done.

xi) Lubrication of all gears, motors, motorized valves, gates and other parts of the system.

xii) Check all valves and gates for their manual and electric operation. Operation of valves must be checked from local control console, switchgear and through PLC system. Any defect observed must be made good.

xiii) Make good all circuits and buildings, all electrical, mechanical and instrumentation equipment, substation equipment, lighting, DG Set and earthing system associated including replacement, if any (as required).

xiv) Painting of the exposed mild steel components of pipeline, ladders, railings etc. must be done.

xv) Make good landscaping of the surrounding areas of the pumping stations, free from shrubs, weeds, grass and other unwanted vegetation.

xvi) Ensure safety accessories, e.g. gloves, shoes, first aid box, etc.

xviii) Ensuring fire and safety equipment.

17.4.3 Lubrication

The Contractor, in the operation and maintenance manuals, shall furnish a complete schedule

of recommended oils, grease, and other required lubricants.

Where lubrication is effected by means of grease, preference shall be given to a pressure system which does not require frequent adjustment or recharging. Frequent, for this purpose, means more than once in a month. Where more than one type of special grease is required, a grease gun for each special type shall be provided for the usage.

17.4.4 Spare Parts

All spare parts used for the equipment in the maintenance of the system must be from the manufacturer of the equipment or, if the equipment itself has been made with parts from other manufacturers, the parts must be of the same make as used in the equipment supplied and installed.

All spare parts shall be packed for long storage under the climatic conditions prevailing at the Site. Each spare part shall be labeled on the outside of its packing with its description, number and purpose and, if more than one spare is packed in a single case, a general description of the case contents shall be shown on the outside and a packing list enclosed.

17.4.5 Electrical System

The Contractor shall hand over the following at the end of Operation and Maintenance Period: Revised as built drawings based on all modifications during O&M Period. All Electrical Drawings like Single Line Diagrams, Control Circuits Equipment Layout, Cable Layout, and Cable Schedules, Lighting Layouts, Earthing Layouts etc., should be maintained and handed over.

(ii) Details of Protective Relay Settings and time relay settings including any changes done during the Operation and Maintenance period, Details of Oil Changes /Filtration of Transformers, Records of any changes made in the System during the Operation and Maintenance period etc should be maintained.

(iii) Equipment wise maintenance record during O&M Period, as per daily checking out/inspection and regular (every 6 months or 12 months).

(iv) Motor wise Power consumption Details and over all power consumption detail of plant.

(v) Details of IR Test of all Equipments like HT/LT Switchgear Panels

(vii) Equipment wise technical data given by equipment lier.

14,I1 O/2,N of Materials and Operation & cvi) List of mandatory spares that are ual (hard copy or soft

to be mainta bd a. at t3 pf?wcar?

CD- 'n plant, if it is below same has to be replenish

0_____ .

(ix) Details of Measurement of Earth resistance, Earth Pit wise and Overall Values during the O&M Period.

(x) Details of Illumination Levels during the O&M Period along with details of changes, if any effected during the O&M period.

17.4.6 Electrical Checks to be done during handover after O&M Period

(i) Contractor to provide a test schedule & format to be approved by engineer before commencing any test.

(ii) Checking of all electrical equipment, items etc as per bill of materials. Visual checking and tracing out the circuit based on revised as built drawings.

(iii) Physical Operational checks of all Equipment & Protections have to be done.

(iv) Power frequency voltage tests & IR measurement for various electrical equipment, items& cables to be done.

(v) Testing of transformer oil samples.

(vi) Measurement of earth resistance for individual earthing system & overall for the installation.

(vii) Checking of Lightning Protection System.

(viii) Measurement of illumination level at various premises.

(ix) If any item is found to be faulty during the above checks/tests the same shall be rectified/replaced as necessary.

17.4.7 Instrumentation, Control and Automation System

The contractor shall hand over the following documents/manuals/programs at the end of Operation and Maintenance Period for STP &ISPS/TSPSs under this contract:

i. Detailed drawings and O&M manuals of all the Instruments, Panels, Valve Actuators, Field Instruments etc supplied under IC&A package of the contract.

ii. Detailed drawing and manual of the PLC installed .Manual shall include the PLC series installed along with complete details on I/O modules, Ethernet switch, Relay modules, and converters (if any).

iii. A complete manual shall be provided which shall include operating instructions and troubleshooting techniques of the PLC and

_____e.tioubleshooting techniques of the SCADA and accessories installed, illustrate_____

0. A complete manual shall be provided which shall include operating instructions and troubleshooting techniques of the interface control panel to Cauvery Bhavan, illustrated with examples .This shall be provided along with the standard manufacturer's literature.

i. Interoperability testing tool/software shall be provided along with relevant manuals and operating instruction with examples.

ii. Latest PLC program back-up, SCADA software back-up with license, SCADA database backup, reports and alarm back-up, Historical archived data containing reports and alarms and configuration set-up shall be provided.

iii. All softwares used under ICA shall be handed over along with their original licenses.

iv. Complete list of database /addresses shall be provided clearly indicating the spare tags for PLC, SCADA software..

v. List of mandatory spares that are to be maintained at stores for complete ICA package and their actual availability in plant, has to be provided.

vi. Any password's set to access the internal PLC program; interface control panel shall be provided and demonstrated.

vii. All passwords (PLC, Interface control panel & SCADA and other software/hardware) shall be provided in a sealed envelope and addressed to the Chief Engineer (K).

viii. PLC, SCADA package shall be updated with the latest software version/ patch before handing over. The same has to be demonstrated to the engineer.

ix. Latest licensed version of windows operating system along with MS—Office or equivalent software which is prevailing at that point of time shall be installed on SCADA machines and other machines installed and integrated with the SCADA package. The same shall be demonstrated to the engineer.

x. Contractor shall conduct an adequate training session for the client's staff which shall include PLC configuration, trouble shooting techniques, SCADA configuration and trouble shooting techniques, diagnostic techniques and trouble shooting techniques for wireless technology employed for communication.

xi. The training session shall be of duration of minimum Five (5) working days at a stretch.

for ready reference.

termination details, I/O mapping, database detai

and editable format and loaded in the operator machine available on site. The same shall be demonstrated to the engineer.

17.4.8 ICA Checks to be done during handover after O&M Period for STP and ISPSs/TSPSs under this contract

(i) Contractor to provide a test schedule and format to be approved by the engineer before commencing any of the tests.

(ii) Functional Checking of all Laboratory instruments and ICA equipment including flow meters, pressure and level instruments, vibration monitoring instruments, and wireless equipment being used for communication.

(iii) Loop checks will be conducted.

(iv) All instrument cabling shall be inspected for continuity. If found faulty, the same shall be replaced and demonstrated.

(v) All instrumentation cable conduits shall be checked for damage. If found faulty , they should be rectified or replaced and sealed to the satisfaction of the engineer

(vi) Visual operational checks of all the Panels including PLC panel, SCADA system, and interface control panel, and Surge Control Panel.

(vii) Licensing feature of PLC, SCADA software and hardware shall be demonstrated.

(viii) Functional check of set points change at HMI/SCADA and it's downloading to PLC's concerned.

(ix) Hot-standby feature of PLC and hot swappable feature of I/O .modules shall be demonstrated. If found to be faulty/non-

operational, shall be rectified and if required replaced to normal working condition and demonstrated to the client.

(x) Dual-redundant server feature of SCADA shall be demonstrated. If found to be faulty/non-operational, shall be rectified and if required replaced to normal working condition and demonstrated to the client.

(xi) Functional check of data received/transmitted from remote stations shall be conducted **in** conjunction with SCADA.

(xii) Functional check of interface control panel to Cauvery Bhavan in conjunction with Master SCADA center at Cauvery Bhavan shall be conducted.

(xiii) Historical archiving of all data shall be demonstrated.

(xiv) Availability of memory for smooth operation of PLC, SCADA machines shall be demonstrated. If found to be in-adequate, the same shall be rectified /archived and demonstrated.

17.4.9 Sewage Treatment Plant and Intermediate/Terminal Sewage Pumping Station's Ancillary Works

(i) Make gardens and plantation in the campus area green, neat and tidy with removal of shrubs, weeds, grass and unwanted vegetation and make pruning, trimming and cutting of old big trees from the Plant Area along with.

(ii) Reinstate the roads and lighting fixtures and lighting circuits in campus to it original state.

(iii) Make good and in working condition for lighting fixtures and lighting circuits, water supply facilities in Treatment plant, Sewage Pumping Stations, offices and other buildings.

(iv) The Contractor shall carry out ordinary repairs to buildings. The repairs may include but not limited to the following items:

(a) Easing of doors and windows, monsoon repairs to roofs, attention to drains, rain water spouts, attention to plinth protection.

(b) External white or color wash, external or internal painting, internal distempering, renewal of approach roads within the campus.

(v) Any faults in the electric installation, leakages, earthing, exposed wire ends and any hazards on this account to the users/inmates of the buildings, should be taken care of suitably, wiring, which is damaged or outlived, should be replaced.

(vi) Damaged sanitary lines should be replaced and choked lines cleared.

(vii) Proper drainage of the area around the building should be ensured to avoid stagnation of rain water/ house effluent, in order to prevent malarial conditions. Where courtyards exist in the buildings, their drainage into the outer drains should be ensured. Any choked drains should be cleared properly.

(viii) Leaking roofs should be attended to immediately with suitable repairs/ treatment, as the case may be. The rain waterspouts should also be cleared of blockages, etc. The roof should be swept clean of leaves, debris, etc., if any.

(ix) The plaster on outer walls of the building which is exposed to weather

(xii) Pum House ventilation system to be checked fo

Aturin CiAOlors and Electrical Equipments.

17.4.10 Wireless Communication System

(i) Make good a wireless communication system to ensure reliable and easy communication to and from STP and ISPS/TSPSs under this contract. Make good a wireless communication system to ensure reliable and easy communication to and from STP and Master SCADA control center at Cauvery Bhavan.

(ii) Replacement of batteries, faulty sets and all other non-functional equipment to ensure trouble free communication if required.

17.4.11 Completion Documents

Completion (Handing over) documents shall include on a minimum 3 sets of softcopies and 3 sets of hard copies. The hard copies shall be spiral bounded clearly indicating the version/revision submitted. All the contents shall be indexed. The contents of completion documents shall be clearly legible and shall include original manufacturer's literature on a minimum, and in-corporate any changes as per site conditions.

The comprehensive updated operation and maintenance manuals (six sets) shall be submitted at the end of the operation and maintenance period. It shall be updated based on the principals broadly listed in Part-16.

17.4.12 As-Built Drawings

Revised As-built drawings based on all modifications during O&M Period shall be submitted at the end of O&M period. It shall include all drawings of treatment units(plan and all necessary sections), utility and ancillary buildings, site layout of treatment plant and pumping stations, drawing of pump house, layout of pumps and all other mechanical equipment and piping, all electrical drawings like Single Line Diagrams, Schematic

SECTION 8:

DRAWINGS

Refer Annexure-1

SECTION 9:

BILL OF QUANTITIES

(Filledvide Karnataka Public Procurement portal under financial document through work template)

Sl No	Description of item (with brief specification and reference to Book of specification)	Quantity	Unit	Rate in Rs	
				In figures	In words
	Separately Enclosed				
	Total price in figures				
	Total price in words				

Note:

(1) Item for which no rate or price has been entered in will not be paid for by the Employer when executed and shall be deemed covered by the other rates and prices in the Bill of Quantities (refer: ITB Clause 11.2 and CC Clause 37.2).

(2) Unit rates and prices shall be quoted by the Tenderer in Indian Rupees.

(3) Where there is a discrepancy between the unit rate and the line item total resulting from multiplying the unit rate by quantity, the unit rate quoted shall govern [ITT Clause 24.1 (b)]

SECTION 10:

FORMAT OF BANK GUARANTEE FOR SECURITY DEPOSIT

To: _____ [name of Employer]

_____ [address of Employer]

WHEREAS _____ [name and address of Contractor] (hereinafter called "the Contractor") has undertaken, in pursuance of Contract No. _____ dated _____ to execute _____ [name of Contract and brief description of Works] (hereinafter called "the Contract");

AND WHEREAS it has been stipulated by you in the said Contract that the Contractor shall furnish you with a Bank Guarantee by a recognized bank for the sum specified therein as security for compliance with his obligations in accordance with the Contract;

AND WHEREAS we have agreed to give the Contractor such a Bank Guarantee;

NOW THEREFORE we hereby affirm that we are the Guarantor and responsible to you, on behalf of the Contractor, up to a total of Rs._____ [amount of guarantee] [63]_Rupees_____ _____[in words], and we undertake to pay you, upon your first written demand and without cavil or argument, any sum or sums within the limits of _____ [amount of guarantee][64] as aforesaid without your needing to prove or to show grounds or reasons for your demand for the sum specified therein.

We hereby waive the necessity of your demanding the said debt from the Contractor before presenting us with the demand.

We further agree that no change or addition to or other modification of the terms of the Contract or of the Works to be performed there under or of any of the Contract documents which may be made between you and the Contractor shall in any way release us from any liability under this guarantee, and we hereby waive notice of any such change, addition or modification.

This guarantee shall be valid until 30 days from the date of expiry of the Defects Liability Period.

Signature and seal of the guarantor _____

Name of Bank _____

Address _____

Date _____

[63] An amount shall be inserted by the Guarantor, representing the percentage of the Contract Price specified in the Contract.